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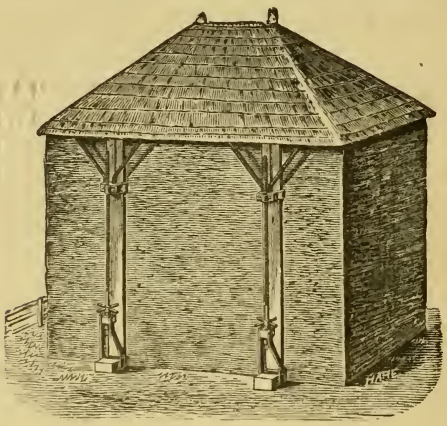

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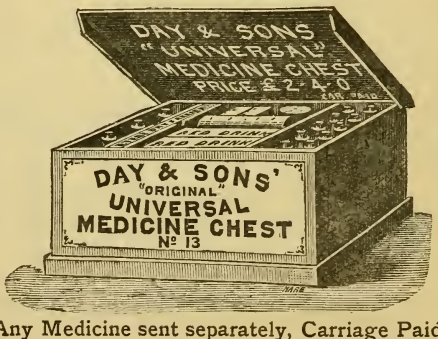

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THE SHEEP AND LAMB

A Practical Manual

ON

THE SHEEP AND LAMB IN HEALTH AND DISEASE

WITH A DESCRIPTION OF DIFFERENT BREEDS

AND

AN ESPECIAL ARTICLE ON THE HUSK WORM (STRONGYLUS FILARIA)

BY

JOHN WALKER

AUTHOR OF "THE COW AND CALF," "BOTFLY OF THE OX (ŒSTRUS BOVIS)," "ERGOT AND ITS MALIGNANT INFLUENCES," "CATTLE POISONS," ETC. ETC.

LONDON
THOMAS C. JACK, 45 LUDGATE HILL
EDINBURGH: GRANGE PUBLISHING WORKS
1887

PREFACE.

"All is the gift of industry; whate'er exalts, embellishes, and renders life delightful."

In resuming the "Cow and Calf" series, it is advisable that the "Sheep and Lamb" should next receive our attention, for both in ancient and modern times the farmer recognised in his sheep flock his greatest source of profit. Though these animals are valued so highly there is still room for improvement in the breeds, and in their management generally, both in health and disease.

In the present volume we have endeavoured to point out all modern improvements in the management of flocks; and these new methods are the result of practical experiments. Our maxim ever is *Experientia cum scientia;* and although we allow that an ounce of practice is worth a pound of theory, yet practice, science, and theory must walk hand in hand ere any good end be attained. The limited space of the present volume does not allow us to deal *in extenso* with any but practical subjects.

Throughout the whole encyclopædia of British farming no branch has been so neglected as the diseases of sheep, and this shows a weakness in the enterprise and research of the present race of pastoral farmers, seeing that many of the ailments are amenable to simple means within the ordinary shepherd's reach. Therefore we have devoted a large section

of our present volume to the treatment of the common diseases of the ovine race.

Never so much as at the present time was it essential to keep up a good breeding flock; and this must be of the highest quality, or the great influx of meat from abroad will deprive the British sheep-rearer of his occupation as surely as night follows day. Let him, however, make use of his many advantages, and he may bid defiance to all nations; for although sheep flourish in many lands, yet none are so suited to their development as the verdant meads of Britain. If then our home sheep-breeders do their best to oppose the foreigner by attending diligently to home flocks, they may rest assured of a bright future. A little repetition may be found in this book, but only so much as renders each part of the work complete in itself.

Having been assisted by an eminent member of the Royal Veterinary College, London, we take this opportunity of thanking him for his assistance.

J. WALKER.

THE SHEEP AND LAMB.

INTRODUCTION.

In undertaking to write such a book as the present we are entering upon a pleasant, needful, yet responsible task. There is no more important branch of agriculture than sheep-farming in which the practical man can render such assistance to his fellow workers, and this by the issue of a manual on the subject alike comprehensive, instructive, and reliable. Such a work this, we trust, will be found, and one that will meet the varied requirements of the present day. If we have failed in this bold attempt, ability to write rather than experience of the subject has been the cause, since for the last three decades our attention has been much occupied with sheep-raising in its various branches, and that upon a variety of soils. The diseases of sheep have also been made a study, and will be fully treated on in this work.

Sheep form one of the few remaining links in the cable by which the farmer hopes his craft will be able to weather the present storm. Should this support give way, bravely as he has hitherto battled with the angry

billows of opposing circumstances, he will find no little difficulty in steering clear of the rocks and quicksands of financial troubles which surround him. Howbeit the British agriculturist need scarcely anticipate such a crisis; for let him assiduously go into the breeding, rearing, and fattening of sheep in an approved manner, and he need not fear but that success will attend his efforts. It is, of course, not every locality that is suitable for such a purpose, but upon this part of the subject we have treated in the following pages. There are, however, few districts where the sheep-flock could not be advantageously grazed by an intelligent owner. In choosing from among the different flocks he will select those best adapted to the quality and situation of his holding. The bleak hills of Scotland abound in a horned, spotted-face, hardy breed of sheep, while in the far south of England the spacious Downs are grazed by flocks of smaller animals named after the lean pastures upon which they feed. These latter are hardy, produce meat of excellent quality, and flourish on herbage so scant that it would starve the Lincolnshire, Gloucesterhire, Leicestershire, and other larger long-woolled breeds, which nevertheless fair sumptuously in the rich counties from which they take their names. Therefore, although we know full well that there are poor clay farms, neither profitable to grow grain nor to be converted into fruitful pastures, yet with care these may be made to carry a flock of sheep if the farmer provides discreetly for his inferior land. There is but little doubt that for many years farmers have too much overlooked their sheep-flocks. This has been a great mistake, for they ever have, like Paddy's pig, materially assisted in paying the "rint." Still it must

not be forgotten that under present and probable future circumstances, even sheep will prove less remunerative than in the days of yore, when frozen meat was unknown, and when the wool alone rendered a rich harvest.

Before reaching the pith and marrow of our work, we wish it clearly to be understood that the flocks must not be augmented without the exercise of great caution. Moderation must be used in this matter, for to overstock with any domesticated animals is the height of folly, seeing that in this way liability to disease and insect pests is greatly increased. Still, on new turf more sheep may be grazed than on old tainted pasture, and on certain fields it is expedient that after two or three years' ley the plough should again be brought into requisition. In such cases the farmers of years gone by found that sheep trod with golden feet, leaving land, by nature poor, well fertilised and rendered fit for any crop. The great difficulty in the way of the present sheep-farmer, and one he looks upon as insurmountable, is the large influx of foreign supplies of meat. This we have never regarded as a matter of such vast magnitude as many have done, neither have we reckoned it too great a difficulty to be grappled with. That the English farmer must change the method of utilising his land there is no doubt; but by taking a judicious line he may throw the gauntlet to his *confrères* beyond the seas. Already more than one large company which has trafficked in foreign meat has failed in the enterprise, and when we can produce good mutton and beef at 6d. per pound at home, which we shall shortly be able to do, some other companies will have (to use a pugilistic term) "to throw up the sponge." It is not likely that Britain

can wholly supply her teeming population with meat, but by converting her land largely into pastoral holdings she can contribute much towards home requirements, and that at a moderate price. Rents and taxes, as a matter of course, will be reduced, and the unremunerative growing of cereals must to a great extent be dispensed with.

In conclusion, it will be obvious to our readers that there is a grand field open to the home sheep-raiser and cattle-breeder, but it is only by taking the tide at its flood that he may hope to retrieve the many losses sustained during the last decade. In order to further so desirable an end the present volume is humbly submitted to its readers.

The History of the Sheep.

Sheep can be traced back through the hazy periods of many ages, even to the time of our first parents, and it is known that they formed a most important item in the wealth and prosperity of many of the nations of antiquity. Indeed, in both ancient and modern history the value of the domesticated sheep is prominently mentioned. In Biblical records we read that "Abel was a keeper of sheep," and many of the patriarchs are mentioned in the inspired volume as being keepers and tenders of flocks. In these early records the sheep-flocks are described with a richness of colour and a minuteness of detail which identify the pastoral usages of those remote periods with the habits of Eastern shepherds of the present day. Scarcely anything seems to have changed in the habits

of men in those countries of pastoral tribes. Where Abraham pitched his tent, with his sheep and oxen and asses and camels—where he sat at the door of his tent —where the stone was rolled from the wells from which his maidens drew water—there the Arab or the wandering Turcoman encamps, and all the scene is like a vivid panorama of the past. In the case of the present people of the desert, their tents, their journeyings, their household cares, their camels, their wells, all inform us with what a matchless fidelity the sacred history has been told.

Even at the present day, on the isolated, expansive "Downs" of England, and the lovely heather-clad hills of Scotland, the shepherd remains a solitary watcher, with no other companion than his faithful dogs. Those who for the first time have traversed these parts in winter marvel that such wild spots, comparatively uninhabited, exist in these islands. In every part of the globe, wherever civilised man has established himself, there also will sheep be found; and, though it may not perhaps be a recognised fact among our readers, it is nevertheless true that flocks of wild sheep inhabit the remote elevated regions of several parts of the globe.[1] These species, however, differ greatly in size from each other, and are even further removed from domesticated breeds, both in habits and

[1] Hunters find them in the Rocky Mountains. The males, which are called Big Horns, when killed are considered trophies of no mean order. Of all wild animals pursued by man none are more difficult to secure than the wild sheep. As active as wild goats, these sheep spring from rock to rock over wide chasms and fissures in the rocky haunts, baffling the most practised hunter. It may be taken for granted that where these wild animals abound, civilised man has scarcely traversed the soil.

specific characteristics. Amongst our home breeds is found great variety with regard to size, wool, and habits; some are nearly akin to the wild-goat kinds, while others, by their vast size of body and their admirably developed fleeces, astonish visitors to the show-yards. Professor Low remarks that "the domesticated sheep, the *ovis aries* of naturalists, is a fictitious species, and not one which has been called forth in the natural state. A species of this kind, however, having been formed, by whatever mixtures of blood, the numbers of it must have been subject, like every other family, mixed or pure, to variation under the influence of external agencies; and thus, independently of the differences produced by differences of origin, there are those which have been produced by climate, food, and domestication, giving rise to those great varieties which, even under the narrowest geographical limits, present themselves."

The longer any species has been under domestication, and the more complete its subservience to mankind, the greater the alterations which have taken place. Strikingly among the changes these unsubdued varieties pass through when brought under control, is the exchange of alertness of the untamed species for a heavy indolent disposition, while the lengthy limb and the comparatively slender, though strong, active, and graceful form, give way to the more ponderous and inactive shape of the home-reared animals. Again, the coarse, dry, brittle coating has been succeeded by soft flexible wool, which has contributed to one of our staple industries, and afforded an essential part of man's apparel for centuries.

A writer upon the sheep observes: "When once

completely subjugated, he never again appears to acquire the faculties which fit him for a life of liberty. Give him afterwards what freedom we may, he remains more or less dependent upon us, and would fall a prey to wolves and the swifter feræ were he not under human protection. Yet he is not the stupid and insensible creature which some represent him to be. When entirely subdued, indeed, his natural instincts are blunted, and he loses the providence and sense of danger which are natural to him; but when left in a state of comparative liberty, as on the mountains of Scotland and Wales, he shows that, though comparatively feeble, he is not without power of guarding himself from danger. When attacked by dogs or foxes the flock forms a circle, with the rams in front, presenting a face to the enemy." It is marvellous, in this semi-wild state, how these animals instinctively, as it were, choose a leader; and the reckless manner in which they follow it often causes the destruction of the whole flock. Panic-stricken they rush on, impelled by this instinct, and should their leader take a false step, over some precipice or into some treacherous lake, they one and all follow, and, being unable to extricate themselves, the whole flock too frequently perishes.

Every one associated with the farm must have witnessed with admiration the great affection displayed by the ewe for her offspring, and with what courage she defends it from all intruders. The puny cur may scatter the flock, filling them with dismay, at any other season of the year, but the ewe with her new-born lamb bids defiance to a host of enemies. Thus we would point out that though the change from unfettered

liberty to domestication has altered the animal in almost every other respect, the instinct of affection for its young is in no way lessened. Throughout the animal world it is the same: whether it be the treacherous tigress or the docile sheep, maternal love rules paramount.

Various Breeds.

In giving the characteristic features of a few of the leading kinds of sheep, we trust no breeders or admirers of any particular flocks will feel that their fancy has been overlooked. Our limited space will not allow of reference to many kinds, neither perhaps is it essential, to fulfil the object of the present volume.

Shropshire may be justly proud of the flocks to which it gives the name; they are indeed difficult to rival, and, considering wool has been making such a low price, it behoved the sheep-breeders to study the meat-producing qualities of the animals rather than the fleece. The Salop sheep are not a very old-established breed, but nevertheless they appear to have been brought to perfection. The meat is of high quality, containing a large proportion of lean to the fat; and thus it is that butchers allow the black feet to remain on the carcase, knowing them to be a high advertisement for the mutton. The "Shropshire" animals run to large size, and will graze out from the ordinary pasture as shear hoggs up to 20 lbs. per quarter, while such as are specially prepared may be brought to more than double that weight. They have another great advantage in being possessed of a robust constitution; they thus

cross well with other kinds, and impart largely their quality and hardiness to the progeny. As mothers they are not to be surpassed, being prolific, giving rich milk, and bestowing unbounded attention upon their young. Either fat, or made off for stores, their lambs always average a high figure in the market. They have, however, one bad quality, *i.e.*, being subject to foot-rot. This disease only becomes of serious consequence on certain soils, and here the farmer has to dispense with the "Shropshire" for some other breed.

The "South Downs" have a small head, face lightish-black, eye full and bright, and the part of the head between the ears—especially at the back of the neck—liberally provided with wool. The neck, where it joins the head, is thin, but it swells out to where it joins the shoulders, there becoming full and high. The legs are of moderate length, neither too long nor too short, and of a dark colour or speckled; between the front legs the brisket projects considerably, and this is wide and deep. The back is flat from the shoulders onwards; the loin is broad and flat, and the hip wide. The barrel is round, and the belly well woolled. The quality of the flesh is even finer than the Salop, and the flavour is excellent. Moreover, they make very good mothers. Although these small hardy sheep will subsist and even fatten upon the scant herbage of the South Downs, where larger breeds would be unable to exist, they cannot withstand the cold of more northern latitudes. They are supposed to be the oldest breed of sheep in the country, some writers having found evidence of their existence in Sussex since the time of William the Conqueror.

The long-woolled breeds consist of the "Cotswolds,"

the "Leicesters," and the "Lincolns." The first are named after the hills on which they roam in Gloucestershire. They are a large breed of sheep, cutting heavy fleeces of long stapled wool, which, when the latter is at a high price, is a great consideration with the farmer. Although the carcase grows to a heavy weight, the mutton is not up to a good standard in quality. Fat abounds largely in proportion to the lean, and the grain of the meat is coarse. Howbeit, blended with some finer breeds they produce excellent sheep, profitable both in wool and meat.

The "Leicesters" are fast changing their old characteristic features, being much crossed with the Lincoln. By thus blending them farmers found that they improved the size, wool, and quality. The old "Leicesters" are of an exceedingly fatty nature, much disliked by the butcher, cutting perhaps less lean to the fat than any other breed. Years ago people's tastes were more easily pleased than at the present day, and taking into consideration the aptness to feed, the wool, and size of these sheep, they stood in good demand amongst Midland graziers, for they could accommodate themselves to many varieties of soil.

The "Lincolns" are a grand breed, and in that rich county come to very large weights, while their wool is correspondingly abundant. These, however, in common with other long-woolled sheep, lack quality in mutton, while the bone is coarse. They need rich land, too, and if run on lean pastures soon languish and fall a prey to some of the numerous diseases to which ill-nourished sheep are subject. We have seen some exceedingly fine flocks of sheep raised by crossing these animals with the "Shropshire Downs"—indeed, for fat

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SHROPSHIRE SHEARLING RAM, "ROYAL PRESTON."

Bred by, and the Property of, Mr. Joseph Beach, Breewood, Stafford, Winner of First Prize at the Royal Show, Preston.

lambs a mixture of these with the Dorset will give all that is desired. Although these large breeds of long-woolled sheep are fair mothers, the lambs are by no means hard, and need the attention of a careful shepherd for the first week. In any case the percentage of mortality is much greater than in the smaller and more active kinds.

The "Hampshire Downs" are black-faced, larger than the South Downs, and much coarser in every feature. They are a hardy race, thriving well either between the hurdles or on the Downs from whence they take their name. Although nearly or quite as large as the Shropshire, they lack the uniform features and the stately gait of that grand breed. Still, hardness of constitution may be considered a characteristic of the "Hants," while the wool, though short, is of good quality. These sheep have been much improved within the last half century.

Another English breed which must not be overlooked is the "Oxfordshire Downs." They are fine animals, growing to heavy weights under generous treatment, and their yield of wool is in excess of any other of the "Down" sheep. Therefore, before the large influx of foreign meat, and when the British taste was less refined, these flocks were favourites with many breeders, and even at the present day on their native soil they are held in high estimation. It was about sixty years ago that several very eminent breeders undertook the construction of this new breed, which was in a measure intended to possess the great weight of the long wool with the hardiness and good constitution of the "Downs." Not till 1850 were they known as "Oxford-

shire Downs." In 1862, at Battersea, it appears, a separate class was first allowed them by the Royal Agricultural Society, at which time they were rather an abrupt breed, but they were gradually improved upon till 1872, when the Duke of Marlborough, at the Smithfield Club, took the Champion Prize with "Oxford Down" wethers as the best pen of sheep in any class. Since then they have many times been well to the front at our most high-class shows. This proves that the breed is progressing and well worthy of our notice. A real "Oxfordshire Down" should, about the head and legs, be of a dark colour, and have the poll well covered with wool, adorned with a top knot on the forehead; the eyes should be bold and prominent, as seen in the Shrops, and if they have also the noble gait of the Shrops, so much the better. A good fleece of wool, thick on the skin, not too curly, is admired; and they should have a well-formed barrel on short legs (not grey or spotted), with good firm flesh. A characteristic detrimental to the breed is foot-rot, and on some lands this disease is so troublesome as to lead to the necessity of farmers changing the breed. The ewes are prolific and good mothers.

The "Suffolk."—Last, but not of least value among English sheep, come the Suffolks. Their excellent qualities are fairly well displayed in the graceful group which forms the subject of a prominent illustration in our book. Breeders might well have envied Mr. Gittus, seeing that he took first honours in different show-yards four times in one year with these sheep. Still it is only within the last three decades that the kind were considered worthy the name of a separate breed. Howbeit since that time they have come to the

front with rapid strides until the present day, when there are but few better rent-paying sheep on land suited to them.

The breed originated from a cross between the ancient Norfolks and South Downs, and now the Suffolks combine the graceful form and aptitude to fatten of the South Downs with the hardiness and approved blood of the old horned Norfolks. Fortunately the horns of the latter have disappeared, while black faces and legs still adorn the carcase. New men are now going in with spirit to form flocks of this breed, and in a few years they will stand well to the front. It is even now decided to give the Suffolks a separate class in the Royal Show-Yard, and this they deserve. They come to early maturity, and the lambs always command a good price. They are eminently adapted for grazing spacious downs or land where the flock has to travel far for food. Still, when more generously fed, they give good returns, and would doubtless answer well either to graze in their pure state or crossed with some of the long-woolled breeds in the Midland Counties. The Suffolks would impart quality, without which mutton in the present day is little sought after.

We will now look over the border, and give a few paragraphs on the flocks of our *confrères* in that hilly country. After the last great epidemic of sheep-rot, the English grazier turned to Scotland to again replenish his land. The fluke-pest appeared to have little power on the hardy breeds of Scotland, so thousands of mountain black-faced horned sheep, as well as Cheviots, were brought into England to fill up the deficiency in our home pastures, and it was only then that the

English grazier learnt the true value of the Scottish sheep.

The "Scotch black-faced" sheep are now becoming widely grazed on our English pastures. Previous to the sheep-rot before referred to, few farmers south of the Humber understood how valuable a breed were being grazed farther north. Throughout the Highlands these animals have been and are still largely kept; they are well adapted for the ungenial climate and somewhat inferior herbage of this hilly district. They are particularly hardy, far more so than the "Cheviots," and can be reared in elevated localities where heath is more met with than grass. Indeed they are naturally adapted to withstand the extreme temperature of a rigorous climate; their heavy covering of long coarse wool, and their activity in search of food, afford them advantages over larger sheep which would starve if subject to the rough treatment the "black faces" experience. At the autumn markets in the Highlands immense numbers of these lambs are purchased by more southern farmers for fattening on the turnip crops, and with such generous treatment these hardy animals rapidly increase in flesh and value. By the following spring, if they have been liberally fed, they come out nice weights for the butcher; and the meat is of the highest quality, realising the best price in London or other markets. The quick growth made the first year is a characteristic of this excellent Scotch breed. It is only within the last few years that we ourselves have proved how valuable and profitable a flock the ewes are for breeding fat lambs. Crossed with a Border Leicester

ram some of the finest lambs are produced, and the ewes are such excellent mothers that we have drawn lambs off to market weighing 15 lbs. per quarter at four months old, and this weight is not much exceeded by the mothers. So good is the quality of the meat that the fat lambs command the first price in the market. After subsisting on the scant herbage of their native hills, these sheep feel when depastured in England that they are in a land flowing with milk and honey, and so hardy are they that we seldom trouble to fold them in a sheep-yard, even at night, during the yeaning season. In a flock of these ewes one quarter, on an average, will produce twins. It is pleasant to watch the graceful, deer-like movements of these unique flocks, which are generally under the guidance of a leader. Wild and suspicious though they be, they are by no means devoid of sense, and soon understand to obey the desires of their shepherds. Both males and females are usually horned, but the horns of the former are much longer, and more gracefully curved. In some instances no horns are found in the females, but these are exceptional cases. The colour of the face should be black or slightly spotted, the eyes bold and bright, and the aspect wild; the muzzle should be thick, the body short and square, and the legs short compared with other wild mountain breeds. As so much land of inferior quality is being converted yearly into pasture in England, this breed of sheep will come rapidly into greater favour for grazing such lean pastures as are too poor for larger and more choice sheep to subsist on.

The "Cheviot."—This is another hardy kind of breed,

which derives its name from the extensive range of hills on the borders of England and Scotland known by the name of "Cheviots." On these hills this breed of sheep has for centuries found a home well suited to it. Although more robust than any English sheep, they are less hardy than the "Black-faced Scots," but they are more prolific, and cut a better class of wool. In common with the latter they have, within the last half-dozen years, been much more grazed farther south, having been used for some time by some of the more needy English farmers whose capital would scarcely allow of their buying more expensive flocks. They are not of so wild a nature as the "Black-faced Scots," grow rather longer, are pretty equal with regard to profitable grazing, and need very similar treatment. But though so near akin to that race both in locality of origin and in present habitat, they materially differ from them at once in character, habit, and adaptation; and, while very profitably substituted for them on some pastures, have been just as unprofitably preferred to them on others. "The Cheviot sheep," says Professor Low, "are destitute of horns in the male and female. Their faces and legs are white, exceptions merely occurring in the case of individuals in which these parts are dun. The body is very closely covered with wool, which is short, and sufficiently fine for the making of certain cloths. The two-shear wethers, when fat, may weigh on an average from 16 to 18 pounds the quarter, though with great differences, dependent on the natural productiveness of the pastures, and the method of treatment when young. The ewes are usually reckoned to weigh from 12 to 14 pounds the quarter, though with such differences as depend on the nature of the soil and

pastures, and the method of treatment. The mutton of these sheep is very good, though inferior in delicacy to that of the South Down and Welsh sheep, and in flavour to that of the 'Black-faced heath' ('Black-faced Scotch') breeds. Their natural form is like that of all mountain breeds, with a light fore-quarter, but this character is removed by the effects of breeding, and the modern 'Cheviots' are much better in this respect. The body is somewhat longer than is usually the case with the heath breed, which has given rise to the popular distinction, in districts where both breeds are cultivated, of long and short sheep. They are larger in the lower countries where a supply of turnips can be given, while they are lighter in the more elevated tracts where artificial food is scanty or wanting. The breeders adopt the kind of animal which is suited to the pastures, preferring a short-legged larger sheep for the lower farms, and one of lighter and more agile form for the colder uplands. The Cheviot sheep are of quiet habits, possessing, indeed, the independence of a mountain race, but having none of the indocility which distinguishes some other races. They are exceedingly hardy, their close covering of fine wool enabling them to resist the extremes of cold. They feed more on the grasses and less on the shoots of heath than the black-faced breed, and are consequently less adapted to a country of entire heath, and require a larger range of pastures to support an equal number of animals." Year by year marked improvement is being made in this breed, chiefly by the continual infusion of "Leicester" blood, and the more generous treatment which the flocks receive. This is as it should be, for they are sheep alike to be commended for quality of mutton,

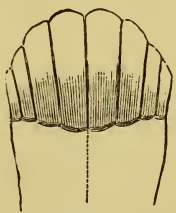
their hardy nature, fruitfulness in the lambing yard, and the little trouble they give the shepherd either in the yeaning time or at any other season.

Definition of Age.

Notwithstanding the simple manner in which the age of sheep may be ascertained, good flocks are sometimes ruined by the owner not making judicious drafts. From his being unable to tell the age of the sheep, big old animals are kept on for breeding, while the young, low-conditioned, two-shear, which has perhaps been reduced from bringing up two lambs, is culled. From two to three-shear is the very age, of all others, that the ewe proves most remunerative. She grows in size, nourishes her lambs well—often bearing twins—and fattens quickly after the lambs are weaned. Seeing, then, how requisite it is that every farmer should be able to judge the age by a glance at the teeth, we give the following plain directions; and as Michaelmas is the usual time for drafting, we give drawings of the teeth at that season.

ONE SHEAR.

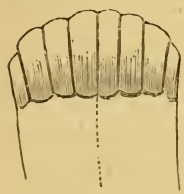
The one-shear sheep is known by having three lamb's incisor teeth and one full tooth on each side of the mouth. Sheep belong to that class of animals which have no incisors in the top jaw, and we shall have no need to mention the molar or double teeth.



TWO SHEAR.

The two-shear sheep at Michaelmas has two small or lamb's teeth and two broad or full-sized teeth on each side.

The three-shear at the same season will be found to have three broad teeth fully up on each side, and a narrow lamb's tooth may or may not be left by the side of the full-sized teeth.



THREE SHEAR.

At four-shear the mouth is full (*i.e.*, eight full-sized incisor teeth are seen), and the sheep has arrived at maturity. From this age these animals go gradually down hill, and should be kept no longer in the flock. After four-shear the age cannot longer be positively judged by the mouth, although the following defects are pretty well understood by the old sheep-breeder. In some animals the teeth are worn at the top, gaps will be observed between them, and later on they are worn almost down to the gums. Another sign of age is when the teeth grow to a great length, and are also wide apart. It is somewhat difficult to explain why some teeth should grow to great length, while those of another animal of the same age are correspondingly short. The difference in the food the sheep subsist on doubtless would partly account for this, but not altogether, which we have proved from our own flocks—for vast difference appears in the mouth when the food has been the same. The farmer will find different breeds vary slightly in the time of putting up their teeth; a difference will also be found when the lambs are born at different periods. Other signs of age are thick lips, wide mouths, instead of the sharp, comparatively picked and neat mouths displayed by most young sheep; increase in size of belly, a hollow in the loin, and loss of teeth.

FOUR SHEAR.

The descriptions and figures we have given will, almost without exception, prove a safe guide, and we caution all young sheep-breeders to regard these marks attentively, for upon them the profits from their flocks will greatly depend.

Variety of Names.

There are so many different names by which sheep of various ages are called in different districts, that we deem it expedient, before advancing further with our work, to define them as minutely as possible. From the time of weaning until the first shearing the females are called "ewe tegs" or "gimmer hoggs;" after which, for the next and one year only, they are called "gimmers" or "theaves;" the second, the third, and fourth year after this they are called "two," "three," or "four-shear ewes" respectively. The males, from the time of weaning to the first shearing, are called "hoggs," "hoggets," "hoggerels," or "tup tegs;" for the next year they are known as "shearlings," "dinmont tups," or "one-shear tups;" after which they are termed for the second, third, and fourth year "two," "three," or "four-shear rams" respectively. When the male is castrated, he is, from the time of weaning till first shearing, a "he teg;" after first shearing a "shear hogg," a "wether," or "wedder hogg;" then "two-tooth," "three-tooth," or "four-tooth wether;" and after this "full-marked." In both England and Scotland a "lamb" is the general name for all new-born sheep, and that designation is retained till the animal is weaned: it is then known either as a "ewe lamb" in case of a female, a "tup lamb" in the case of a male, and a "hogg lamb" in the case of a male castrated. From the time of weaning

to that of the first shearing a female sheep is called an "ewe hogg" or "ewe teg." After being first shorn it is called in Scotland a "gimmer." After the second shearing, if the sheep is with lamb, it is called a "ewe," if not, a "barren gimmer;" and, if not put to the ram, an "eild gimmer." After the third shearing it is called a "winter ewe," and after the fourth shearing an "aged" or a "three-winter ewe." When a ewe ceases to give milk she is called a "yeld ewe," and when taken from the breeding flock, no matter what her age may be, she is termed a "draft ewe;" while, when "gimmers" are taken away from the flock, as unfit for being bred from, they are called "draft gimmers." From the time of weaning up to that of the first shearing a male not castrated is called a "tup hogg;" if castrated a "he teg" or "wether hogg." After the first shearing a male not castrated is termed a "shearling tup;" the castrated a "dinmont." After the second shearing the non-castrated male is a "two-shear tup;" the castrated a "wether" or a "two-shear wether." After the third shearing the non-castrated male is a "three-shear tup;" the castrated a "wether" or a "three-shear wether." After the fourth shearing the non-castrated male is an "aged tup;" the castrated a "wether." It will be seen that while the names given to sheep of different ages both in England and Scotland correspond in many, yet in instances the nomenclature of the latter country is totally different from that used by flockmasters in England.

Autumn Management.

In our present work it will be desirable to give a few hints upon the proper management of the flock

in autumn, winter, spring, and summer, beginning with the former quarter.

By this time the maggoting season will be nearly over, but still the shepherd should keep a sharp look-out, for the worst attacks often occur during a spell of sultry weather in early autumn. As soon as frosty nights set in, however, the flies lose their activity, and their days are numbered. Foot-rot prevails at the latter end of the year more than at any other season, and only the most persevering attention on the part of the shepherd will keep the flock sound on land suited to the plague. The feet should be kept properly pared, which will prevent the lodgment of maggots under the clays, and will keep away other ills. It must not be overlooked that common foot-rot is very infectious, and therefore there will be no hope of curing the flocks unless the lame ones are kept apart from those that are sound. This, however, is treated on *in extenso* in that section of the work relating to diseases.

Lambs require careful attention to insure their being kept in a gentle thriving condition. Where they have not been already taught to take corn or cake they should be induced to do so at once. The best plan to accomplish this is to drive them at night into a fold placed on a sound part of the pasture. They may be released each morning an hour after sunrise, and in about a fortnight it will be found that the whole of the flock will eat the new food with avidity, and will then look eagerly for their feeding times. During the time they are acquiring a taste for the food the troughs should be turned over each morning to keep them dry, and fresh food should be supplied each evening, while any food rejected should be removed. A half pound of

cotton cake, or half a pint of good sound oats, or an equivalent in Lamb Food such as is sold by the leading firms, will be sufficient per head for a commencement. It is a delicate matter to teach these young animals to take new food, if the work is not set about in a proper way. The old custom of starving them to make them do it was a most reprehensible one, ruining the constitution of many a weakly animal that most needed the extra support. Lambs should be kept on fresh pastures, as they always do badly on old, long, coarse grass.

As the autumn advances such flocks as are to be wintered at roots should be introduced gradually to them. The lambs should have an open run, or be given a large fold on some early white turnips, when they will soon acquire the desired taste. After a month at the white turnip the more nutritious swedes will be matured sufficiently for consumption, and be readily taken. When the lambs get well settled to the swedes it is seldom that deaths occur, an improved condition being soon observed. Occasionally a teg is seen to suffer from "gid" or "sturdy," in which case it is better to send the victim at once to the butcher, as treatment is seldom deemed advisable. The roots should be clamped when ripe, and may be supplied several times during the day. It is better to cut them and give them in troughs, giving each time as much as is well cleared up. A large fold is ever preferable, and the soundest ground should be reserved to fold over in the wettest weather. In case of floods the flock should be removed on to a sound pasture for a day or two. It is positively essential that some dry food should be given with roots, or, owing to their containing so much water (over 90

per cent.), great mortality is liable to result; indeed, this is the case with sheep of any age on roots. Corn and cake are generally well spent, as both the flock and land require the benefit resulting from the extra food consumed.

The shear hoggs and theaves or one-shear sheep next demand our attention. Where it is desired to get the shear hoggs off fat from grass to market, they must lie thin, and be now forced along on some rich pasture land, and be drawn off to market as fast as fit. Others being prepared for turnips need only to be kept growing along, and as soon as the white turnips are ready the animals will be better folded thereon. In selecting shear hoggs for roots the largest-framed and best-growing sheep should be chosen; they will grow and fatten into much more paying animals than small-framed, close-set sheep.

The theaves will be either required to fill up the breeding flock, or to be sent off to the butcher to make a little money in early autumn. As a rule they fatten more rapidly than the male sheep. Those theaves that are to be brought into the breeding flock can be put with the store flock, and can be kept on a poorer pasture until near mating time; then, however, their condition should be improved. Often some mustard and rape, or fresh aftermath, is to be had at this season, or abundance of herbage may be found on the pastures from whence the fat sheep have been drawn.

Many thousands of sheep of different ages change hands in the autumn, large numbers being usually disposed of at the large auction sales. There are numerous breeders who have no turnip land, and therefore have to reduce their flocks considerably against

winter. Then there are turnip farmers who have not convenience for rearing, so that it is to the mutual interest of the two parties to trade together. Sheep need but little attention in early autumn beyond careful shepherding.

As the two-shear ewes are seldom parted with, being in the prime of life for breeding from, we will pass them by and speak of the three-shears. Most breeders in England who have much regard for their breeding flocks draft their three-shear ewes in autumn. A few less careful breeders keep them a year longer, but we do not approve of this plan. The man who breeds his own stock should above all things keep only young and growing animals about his farm. Young ewes improve in size, supply more wool, and produce healthy progeny; moreover they improve in value each year until they are sold. There should be on the farm *no animals that are going down the hill;* to keep such is placing money in sinking funds.

Among the hardier breeds that abound in Scotland, farmers keep breeding ewes in their flocks several years longer than their English brethren do. A mountain sheep will be as full of vigour at five or six-shear as our English sheep are much younger; even among English flocks, too, some bear their years much more easily than others. As a rule the black faces are hardier than the heavier white-faced long-woolled kinds. To return to the black-faced mountain sheep, we have found such as we have purchased and grazed in England marvellously vigorous, their constitutions and feeding qualities appearing little, if at all, impaired at five or six years old. At such ages our home-bred sheep would scarcely have a tooth left.

Many graziers having good sheep land buy at the Michaelmas sales home-bred draft ewes, so as to breed one more lot of lambs for fattening purposes; in fact, we have been much engaged in this occupation ourselves. The draft ewes often bring couples, have little trouble in yeaning, and give a most abundant supply of milk. Thus the lambs soon get fat, and the dams become fit for the fat market soon after their offspring are taken from them. It used to be the custom to buy up large quantities of these draft ewes to put on roots, but the demand is now greater for young sheep—better quality of mutton being the order of the day. There are other farmers who fatten their draft ewes off at grass; and where this custom is followed they should be placed on the richest pasture fields, and, if needed, corn should be given, so as to insure their being got off to market before winter sets in. It is a bad practice to let the passing year's stock trample on the heels of animals laid in for the following season; by doing this many a stock-keeper has impoverished the herds and flocks going on.

The breeding ewes should be kept in gentle thriving condition during the mating season, for when the ewes are thriving at that time more lambs will follow than when the flock is fed on a too sparse pasture. It is not, however, wise to give heating food, such as beans, &c., all that is needed being a good pasture, or such keep as we have advised in an earlier part of this chapter.

Winter Management.

Even if Jack Frost has not embraced with his iron grip the whole surface of the ground, and the hills and

vales be not clothed in a snowy raiment, it is necessary for the sheep-farmer to be prepared for such inclemency. With December the winter quarter begins, but the most severe weather has unfortunately of late years visited us towards spring.

The tegs or hoggs on the pastures, and those on turnips, should be frequently inspected by the farmer, and it would be well to make these visits about feeding time. On the pastures it would be well to notice if the young animals come up to the troughs, if they all get their share of food, and if it is cleared up with avidity. Should any animals hang back from the food, they should be viewed with suspicion, and be at once removed to a paddock or orchard where they can receive extra food and attention. In a large flock some of the weaker animals need constantly thus removing to be more carefully attended to. The pasture should next be inspected to see if any fresh blades of grass abound. Only a scanty bite can of course be expected in the winter season, but that little should be young, and not the old coarse herbage left from the previous summer; where rough grass abounds considerable mortality is the common result. Fields should be thinly stocked; one teg to the acre is ample. The supply of artificial food, such as cake and corn, may be increased during the winter season. Half a pound of cotton cake and half a pint of oats will not be too much for fairly strong tegs. It is better at this season also to keep a rack supplied with hay, so that the animals can run to it at will. This hay should be kept dry, and be of the best quality; only sufficient for the day's consumption should be given at one time. The watering-places must be looked to, that they are not

frozen up, for although sheep wholly subsisting on vegetable food seldom drink in winter, with an increase of dry food they will require to do so freely.

The tegs at turnips next demand our attention. Here plenty of trough room should be given, and if any underlings are observed that cannot hold their own with stronger companions, or from other causes do not take to the roots and corn kindly, the same precautions should be taken as advised with the weakly ones from the grass pastures. Tegs at roots should towards Christmas be getting in good condition, and the hand should frequently be placed on the back to ascertain whether they make satisfactory progress. The corn and cake may be increased as the winter advances, and it is requisite that a good supply of sweet hay should be given. The shepherd must take care that the roots are not frozen, or they will be likely to upset the flock. We approve of large folds, so that the animals can get plenty of exercise. In boisterous and cold weather it is often within the power of the shepherd to give a more sheltered situation to the animals, and above all things sheep on roots, particularly, should have sound dry ground to lie on at all times. The feet of any lame ones should be examined, for the cause of lameness will often be found to be dirt wedged between the clays. The flocks must always have an early feed in the morning, several during the day, and one just at sunset, for the nights are long at this season. Each meal should be well cleared up before the next is given, and the troughs should be kept as clean and dry as possible. Such animals as are being got forward for the butcher will need extra artificial food each month until they are disposed of at market.

The one-shears, both male and female, will have been made off fat, *i.e.*, such as were fatted at pasture. Those that are fattened on the roots need a liberal allowance of extra food. Beans, oats, or linseed and cotton cake are all suitable. If practicable, it is well to sell off a portion of the flock in February, as that is the month when the demand for meat is great; and it is seldom that it pays to keep ripe sheep beyond that time, although the roots may be plentiful. It used to be the fashion to have some two-shear wether sheep to go off in February, but now the call is so urgent for money that few farmers keep male sheep so old. If a few ewes have been put to turnips to fatten they should be hastened on, so that they will be fit for the market when mutton is dear.

The only important work left now is to carefully inspect the breeding flocks, and to provide for their welfare. It is found from experience that they are better kept on diet other than roots until yeaning time, and then they may receive a liberal supply. Many instances are on record where most serious mortality has occurred when the pregnant flock has been folded on turnips. A few supplied in the field are not objected to by some experienced breeders, but even these few roots are better dispensed with if some other food can be substituted. Ewes in high condition from roots are subject to abortion, an abnormal growth of lambs in the womb, and inflammation in yeaning time.

No more healthy quarters can be found in the winter months than a fresh pasture field. The wise man lets his pregnant ewes lie thinly sprinkled over a large space of ground, and in snows and severe frosts gives

sweet hay each morning and evening. Sheep do not care for heated or weathered fodder. We have ever had the best luck with yeaning ewes when the pastures have been sufficiently productive to keep the ewes in condition without any corn or artificial food. In such cases fewer deaths occur at yeaning time from the several complaints to which sheep are subject. The scrambling for corn night and morning injures heavy pregnant ewes, and a flock receiving this grain is ever on the *qui vive* for whatever passes through the field; thus a restless life is spent at that critical stage when the flock needs absolute quiet. The sheep dog too should be left at home, for ewes in a pregnant condition ought not to be worked about by a dog in the manner shepherds are only too used to treat their flocks. If farmers knew how many cases of abortion were caused annually by indiscreet use of the sheep dog, they would be inclined to find an extra lad or two to assist the shepherd instead of this animal. Unless on account of an occasional case or two of foot-rot, there is very little need for sheep being penned at this season, and a sheep dog is seldom required to assist at any other time in enclosed countries. When dressing the feet the ewe in lamb should not be cast.

Occasionally throughout the winter months the farmer should inspect his ewes, to notice what condition they are in. It is essential that they should not lose flesh, and frequently, upon examination, some will be found lower in condition than others. Such lean ones should at once be removed to some paddock or small enclosure where there is fresh grass. Here oats and a few peas may be given, or, what would be better, oats and a little mixed cake. Beans are a little too

heavy for pregnant ewes, but oats may be given with a liberal hand. A pint of oats and half a pound of cake per day will not be at all excessive.

We have above counselled that corn should not be given to the ordinary breeding flock under ordinary circumstances; howbeit in cases of a dearth of grass during extra severe winters, or poor quality of land, or of a lean flock, we would depart from the advised plan and supply corn liberally. The expense of the extra food should not be thought of. The ewes are improved, the lambs get a better supply of milk, the wool is more valuable, and the land derives benefit from the artificial food. It is doubly necessary that good dry quarters should be provided for the ewes to lie on in the field, but they should on no account be brought into yards before yeaning time.

Spring Management.

With the advent of spring we have to make a general change among the flock. We will first deal with the fat sheep. Shear hoggs and theaves that have been lying on roots should be in fit condition for the butcher. The farmer is, however, much guided by the root crops. When they are as plentiful as in the present winter, there need be no hurry to dispose of the fat sheep before March, but it should be so arranged that the crop is consumed by the middle of this month. The roots, if carefully clamped, will keep, and prove nutritious, until April, but when the March winds blow, the husbandman requires to be about his land preparing it for barley. Therefore a general clearance of the sheep should be made by the middle of March. Many

flock-owners are anxious to obtain the wool, but this is often sold to as much advantage on the sheep's back as off it. Moreover, looking at the matter from a humane point of view, considerable cruelty to the animal is avoided by selling the sheep unshorn. There is no doubt that ripe sheep pay better for shearing than such as are not quite made up in all their points. When the animals are shorn, the work should be done in a neat clean manner, only narrow cuts being taken with the shears.

Now with regard to the tegs. Such as have been fatted for killing should be sold off in the same manner as the before-mentioned shear hoggs and theaves. Such as have been stored alone for another season's grazing may clear up the root fields. Very many of these sheep change hands when the roots are consumed, being disposed of to the large pastoral farmers. It is desirable, where practicable, to take the store tegs off roots gradually, or the animals miss their rich food, and are apt to lose condition, a thing always to be avoided. A few loads of roots may generally be held in reserve for dealing out to the flock on the pasture fields. Old graziers know full well that tegs wintered at grass make the most rapid improvement during spring and summer. Such animals as are for fattening during the latter season must be depastured thinly—say one to the acre—among some fattening beasts; but the females that are for breeding, and the males even that are intended for another year's roots, may be run thicker on clovers or poorer pastures. Still, it is improvident at any time to depasture sheep too thickly, for sooner or later such a practice leads to disease. A knob of rock-salt should be placed in every field. The rock-salt roller (sold by

the Rock-Salt Roller Company, London) is most beneficial; it prevents this mineral from becoming dirty, or destroying the turf. Careful shepherding will be now required. Ticks and lice should be destroyed, foot-rot cured where it breaks out, and dirty locks removed a month before shear-day, or indeed at any time when they are seen. During cold weather the animals must be clipped with caution, so as not to cause exposure.

Many flock-owners are not aware of the use sheep are as fertilisers of the ground. It is often found profitable to give them corn or cake all the summer on the clovers or mixed grasses. Thus the animals can be run much thicker, and the field will get a good fertilising.

Respecting this important subject a chapter will be found elsewhere. There is not any danger of disease breaking out from grazing sheep thickly on clovers (seeds) newly laid down. The fields are free from the taint of flocks, as the soil has been used for crops, and has benefited by a long period of immunity from grazing with any animals. Cotton cake is the most profitable food to use, for, low in price as all grain is, cake is the cheaper. On holdings where vetches are grown largely, sheep may be turned to a good purpose by grazing off early crops. If the soil is a nice working one, a good growth of roots may be afterwards obtained. Seeing how low the price of all grain is, many farmers would do wisely to increase their breadths of green crops, and with them their sheep, for, no matter how unremunerative other branches of the farmer's occupation may be, sheep, with good management, are sure to prove profitable, unless it be during times of widespread disease.

In another section of our work we have given details respecting the management of the ewes and lambs in the yeaning yard, therefore, presuming the critical period of lambing has been got over in a satisfactory manner, we will consider the treatment of the ewes and their offspring during the remainder of the spring months. It must of course be understood that on various farms different treatment will be needed. Space in our present work will not allow us to dwell upon the requirements of every district.

The following hints, however, will prove useful in most localities. When the lambs are strong enough to draw "afield" some fresh "seeds" will offer the most generous herbage; where these are not to be had a fruitful pasture should be reserved. The object now is threefold—first, to keep up, or, in many cases, improve the ewes' flow of milk; secondly, to keep up their condition; thirdly, to provide a sweet nutritious bite for the lambs. At about three weeks old the latter will begin to feed pretty freely, and the young fresh blades of grass supply the animals with nutritious and wholesome food.

The ewes with twins must receive first attention. If it be early in the spring, these latter should be supplied with some trough food; but when fresh rich pastures are at hand, they get on very well without it. The objection to giving corn or cake is that the ewes become too restless, always being on the look-out for the corn bag; and sometimes, owing to this, the lambs lose their mothers, and get neglected.

When making lambs fat for market is the object, many different methods have to be adopted. The animals must be kept improving in flesh with their

every-day growth. If, as is often the case, the ewes have lambed out early, roots must be given plentifully, as the herbage even on the best pasture will be scant. Corn and cake must be dealt out with a liberal hand, while the ewes should be depastured in small lots in moderately sized fields. The careful shepherd often arranges that there may be small holes through which the lambs can run to troughs where a little inviting and nutritious food is placed. The dams must not, however, be overlooked, for if they sink in condition their milk supplies will diminish also, and thus their offspring will suffer. If once the lambs are checked in their growth, no amount of subsequent attention will bring them back to their previous flourishing state. If the flock-owner commences with corn for his fat lambs, he must continue it until they are got off to market, and rather than give it up, had better never begin with it.

From the Midland Counties of England we have fed large numbers of fat lambs, and find it more provident to arrange for them to come about the middle of March or the beginning of April, at which time the pasture field and "seeds" offer a plenteous repast. Such lambs are fit to send to market from the beginning of June until the latter end of August, and they often pay much better than the earlier animals. Good grass land will usually make better fat lambs than "seeds," although the latter are useful in the spring. Indeed, early fat lambs should never be attempted, except on genial soil, where roots, rye grass, clovers, or some such early foods can be had. Mangel wurzel is a favourite food of many flock-owners, but we have often been disappointed with the result of feeding on this root,

except in late spring. Before it is matured the ewes fed upon it give only poor milk, the lambs therefore coming along badly, while the dams often scour and lose condition. Swedes are much better food while they last, and cow cabbages, when they can be obtained, are very good diet. The Bibby Cake is a good milk-producer, and improves the condition of the ewe. This cake is sold on a guaranteed analysis.

Summer Management.

A full pasture is reasonably expected in June, and then animals can be generally placed on it for their summer quarters. While the flocks do well it is folly to interfere with them. Shearlings for fattening must be thinly sprinkled about on the rich pasture fields, and they will need but little attention further than what is usually given by the shepherd. Such sheep as are intended for turnips the following winter can be run thicker over aftermath, can clean up old pastures, and indeed rough it more generally than the fattening flocks. As regards the store sheep generally, it will be sufficient if they are kept gently improving in their condition.

There is one thing in summer that demands more attention from the flock-owner than is usually given to it, and that is the quality of the drinking water. Sheep do not imbibe much when they are in good health, and feed from a luxuriant pasture, the moisture from the herbage proving sufficient for them. Howbeit, if these animals are out of health, if the summer be dry, or they lie thickly together, they require water, and this should be supplied in a wholesome state. Again,

ewes with lambs always drink more or less, and if good water is not at hand both mother and young suffer accordingly, for the milk supply soon runs short, and is of unwholesome quality. In either the cow or sheep the evil effects of bad water is at once noticeable in the milk. All old flock-owners remember how their animals ran incessantly to the watering-places when the last very dry summer occurred. Where a good supply of water was obtainable, the flocks did fairly well; but where water was scarce or of bad quality, the reverse was the case.

The watering-places both for cattle and sheep need greatly improving throughout the country. In the summer it is not at all uncommon to see the mouths of ponds one mass of mud and filth, consisting largely of the excreta of animals. Yet the water around this deposit has to be drunk by farm animals, or they must go without altogether. In time they acquire a taste for this unwholesome liquid, and should consequently never be allowed to take it. As many ponds are actually made receptacles for the bodies of such animals that die in their vicinity, there is no nearer way to introduce and propagate disease than by allowing animals to drink thereat.

In August a few grass-fed shearlings should be ready to draft off to market. Trade is then usually pretty good, and seeing that the pastures begin to get bare at that season, it is wise to keep drawing off the sheep as fast as they become fat.

Ewes and lambs call for continual attention. We have had good results from occasionally changing the flocks from "seeds" to grass, and back again. It is not every farm, however, which can offer such a variety of

food; but where this plan is not practicable, the flocks may generally be changed from one grass field to another. Large fields are preferable to small ones, offering more variety of herbage. The shepherd must keep a sharp look out for maggots, more particularly among the lambs. It is better they should be dipped to forestall vermin, for prevention is better than cure. Store lambs are usually weaned in July, and they often do quite as well after being separated from their mothers if they are put on a sweet pasture. When the lambs reach three or four months old, it is a good time to wean them, for at that age the young animals are quite fit to look after themselves. The ewes can then be depastured on any fields where the grass is scant. Sometimes they are folded on late vetches. The shorter they are kept of food (in moderation) the better, for then the milk goes sooner. The store ewes generally clear up wheat stubbles, bean brushes, and clover leys.

If the draft ewes are to be made off fat they will need some good keep, but the sheep-breeder usually prefers them sold as stores, and, as meat is generally low about the selling off season, they make nearly as much money.

Fat lambs are drawn off as soon as ready; and the mothers used for fat lamb breeding, being generally about four-shears, are better put in some rich fields and made off also as soon as fat. They feed very quickly at this season, and the great object should consequently be to keep them supplied with young fresh herbage. Sheep lose condition on an overgrown field, while if the same land is grazed in an approved manner, they soon advance into a ripe state.

Many different opinions prevail as to the number of sheep that can be grazed to the acre. Having tried experiments on several kinds of pasture, we find the fields are often overstocked. If grass land of moderate quality, in an average grass season, be grazed wholly with sheep, no more than four to the acre can be fattened, and two ewes with four lambs will keep a tolerably rich pasture grazed down. It is seldom wise to depasture a field with one kind of stock, and where it is attempted the sward soon shows an uneven face. Horses will graze freely after cows, and sheep after horses; but each animal objects to feed after its own kind. For fattening sheep in summer there is no better plan, in enclosed fields, than letting about one sheep to the acre run with fatting beasts. Some graziers will not allow any sheep on their best pastures in summer, neither will they allow any to graze with the dairy cows. If, in such cases, the fields are winter stocked with sheep the animals make good progress, and are more healthy than on any pastures which have been summer grazed with ovine animals. Lambs will winter better in fields that have enjoyed an immunity from the sheep-flock than on any other land, and such pastures will often bring hopelessly weak lambs or tegs through that trying season.

Mating.

The quality of the future flock will much depend upon the farmer's judgment in mating or choosing a proper ram for his ewes. In selecting a sire, a good constitution should be one of the first considerations. By using a robust animal, not only a larger fall of

lambs may be reckoned on, but they will prove of stronger constitution than such as are sired by a more weakly grown animal. Of course the dams also need to be approved stock, but as the latter are many in number, they cannot all be expected to reach that height of perfection which should be seen in the ram. Rams ought, as a rule, to exhibit the following characteristics:—A head not too large, carried well up; tolerably large ears; bold eye; neck broad where set on the shoulders; level broad back; broad well-bowed ribs; strong loin; thick dock; and large buttocks. The chest or brisket should be wide and stand well forward, while the belly should be pretty large, legs short, and wool abundant, according to the breed.

The best age for a ram is one-shear, and he would then be one and a half years old when brought into use. At this age more healthy progeny may be counted on than from a sheep of any other age, although two and three-shear rams are not objected to. We have always found, too, a one-shear sire more prolific as a stock-getter. It is a common practice to use ram lambs; and if only a dozen or a score ewes are given to an early, well-developed lamb, plenty of healthy offspring will be the result. In such an instance an older sire should follow. Quite often, when too many ewes are given the young animal, he is stunted in growth, and not uncommonly the constitution is so undermined that he does not survive the winter. Whatever be the ages of the rams used, it is wise to change them every fortnight, for some ewes will prove pregnant to certain sires that will not breed to others, although the latter may be fair stock-getters.

The period of gestation in the ewe is twenty-one weeks, and the month of March in England is a favourite time for the ewes to bring forth their young. Yet in some favoured districts it is found profitable to have the lambs come a month or six weeks earlier. After many years of experience in different parts of the country, we have found, considering all things, that early yeaning is a mistake, and the farmer far more often errs in too early yeaning than otherwise. The ewes are in lower condition early in the year, they give less milk, the weather is more severe, and the pastures are bare and unfruitful. It is true, roots and corn can be given in some instances, and only where such food can be abundantly supplied should early breeding be attempted.

There are one or two flocks that bring two crops of lambs in the year; here of course the mating time differs much from ordinary lamb breeding, and the flocks receive very different treatment. Fat lambs are here the object, and Dorset ewes are generally used; but attempts must only be made where proper diet and climatic influences are quite favourable. For several weeks before the ewes are put to the ram they should be kept on generous diet. Artificial food is not advised; but mustard and rape, second clover, or a fresh grass pasture are most desirable. Ewes mated in a thriving condition will always prove more prolific. Sometimes wheat stubbles, bean brushes, and such like fields will keep the ewes in the desired thriving state, but at others they are too bare for the purpose.

It is requisite to know when to expect the lambs at yeaning time, for if all the flock was brought to the fold-yard together, it would be overcrowded. The ewes

are therefore marked as they are served, the most simple plan being as follows:—For the first fortnight after the ram is put to the ewes, use no mark whatever; for the second fortnight, besmear the ram under the brisket, far back, with ochre and grease once a day; and for the third week, use soot and grease. Thus at the following spring, when the ewes' times are fully accomplished, or rather a few days before, all the unmarked ones should be drafted first for the fold-yard, as they will yean first. In a fortnight a second draw should be made, and this time all the ochre-marked ones should be selected, while in another fortnight the black marked ones should be brought home. The shepherd has little difficulty in finding out which are barren, as they have no milk in the udder, and are generally seen skipping about. These should be put forward on some good land to hasten them into condition for the butcher.

About two score ewes are sufficient for a ram; by giving too many, the yield of lambs will be smaller. Some active sires of the Dorset or Down breeds may have a few more ewes than the heavier breeds, such as the Lincoln, Cotswolds, and Leicesters. The more healthy state the ewes are kept in during gestation the better. Several different methods are brought into practice where high-priced prize rams are used, but treatment of prize animals does not come under the subjects treated on in this limited work.

The Lambing Yard.

The yeaning time is by far the most important season in the sheep-breeder's year. The attention of both a

careful master and a trusty shepherd are not only needed during the day, but through the greater part of the night as well; and however much aid the shepherd may require, it should be forthcoming, for upon occasions, especially when the weather is severe, the calls upon him are greater than it is easy to comprehend. The sheep-yard is generally made from some out-buildings and spare fold-yards. It is most essential that a dry position should be chosen, and that the fold-yard should incline towards the south, to give the pleasant rays of spring sunshine a chance of shedding their genial influences upon the new-born lambs. Yet we do not by any means approve of yards being made too warm. This is a common error made by even practical farmers. Sheep in their natural state, often for choice, lie on the soundest and most exposed part of the field, and this being their habit, when they are placed in close yards in large numbers the atmosphere becomes almost stifling to them. Were it not for the young lambs often dropping in the night, we should much prefer that the ewes in the later yeaning time should be placed at night in a sheltered paddock or sound stackyard.

Fifty years ago not near so much close folding was given to the yeaning flocks as at the present time. The best yeaning place is an open shed facing south, with a large open yard. The sheds should be wide, but not too high, and the bottom to the yard should be sound. Hard burnt clay will make a good bottom, and should have a little straw or stubble sprinkled over it, while there should be good under drains. To litter thickly with long straw is a great mistake, for the animals' legs get entangled, manure accumulates, and the sheep in a

OXFORDSHIRE DOWNS. The Property of Mr. GEORGE STREET.
Winners of the Champion Plate, value £50, Smithfield Club.

short time lie on a reeking dung heap. This tends to bring on foot-rot, leaves the animals more liable to take cold when exposed in the fields, encourages inflammation, and indeed tends to a general unhealthy state.

Numerous small pens should be arranged round the fold-yard, to receive the ewes at night-time, as soon as they have yeaned. While these pens should be tolerably warm, they should not be made too close, for it must be remembered that the ewes do not need it, and the lambs have to be shortly exposed in the pastures. A few pens should also be made in distant parts of the sheep run, to place newly yeaned lambs in, and that without having to carry them a distance. The shepherd must on no account leave a newly-born lamb in the fold-yard, or it may come to grief by being separated from its mother or overrun, seeing that so many other sheep are moving about, and are at times in an excited state. It is a still more reprehensible plan to allow a dam with twins to remain in the fold-yard.

A kind and clever shepherd will give a ewe much assistance in yeaning, but it is unwise to hasten the birth. Young ewes the first time of lambing need much more patience in labour than older sheep, but often at last assistance can be given, more especially to the latter, with great advantage.

It is, however, in case of malpresentations that the chief skill and patience are needed. Here only the practised hand should be used. Every shepherd should, as a youth, serve a full apprenticeship in the yeaning yard, and then he would be equal to the occasion when malpresentations occurred. Of course the man with a small hand has much the advantage. In some instances the lamb is found dead and putrid. In such a case the

womb should be washed with "Day and Son's Driffield Oil" and new milk, in equal part, immediately the fœtus has been removed. It is well to hold up the hinder part of the ewe and pour into the womb the above mixture, which should be made with warm new milk; two table-spoonfuls will suffice. This will be likely to prevent gangrene and inflammation of the womb, will cleanse the other parts, prevent injury to the shepherd's hands from poisonous matter, and also save infection from being carried to other sheep that may be in labour and need assistance. Hog's lard, to which no addition has been made in the way of curing, should be always at hand, and the shepherd should well dress his hands with it before commencing to give assistance.

When the ewe has had a hard time yeaning, she should have given her a little gruel, in which may be put a fourth part of ale. The gruel may be continued every six hours, but the ale must be withheld after one or two half-pint doses. A few ivy leaves, a few blades of grass, some roots (either carrots or swedes), or even mangel or cabbage, will prove a tempting and wholesome diet when vegetable food is so scarce. Here again, the advantage of allowing the access of plenty of fresh air must not be forgotten. It is too commonly the case for the weak and exhausted ewe to be placed in a close pen, where, owing to the absence of fresh air, faintness quickly ensues. Generally after yeaning, always after a hard time, the ewe will be thirsty; in the latter case gruel should be given, and at other times some slightly chilled water, or, what will do as well, some fresh rain water. Cold spring water should be withheld.

It not uncommonly occurs that ewes drop their

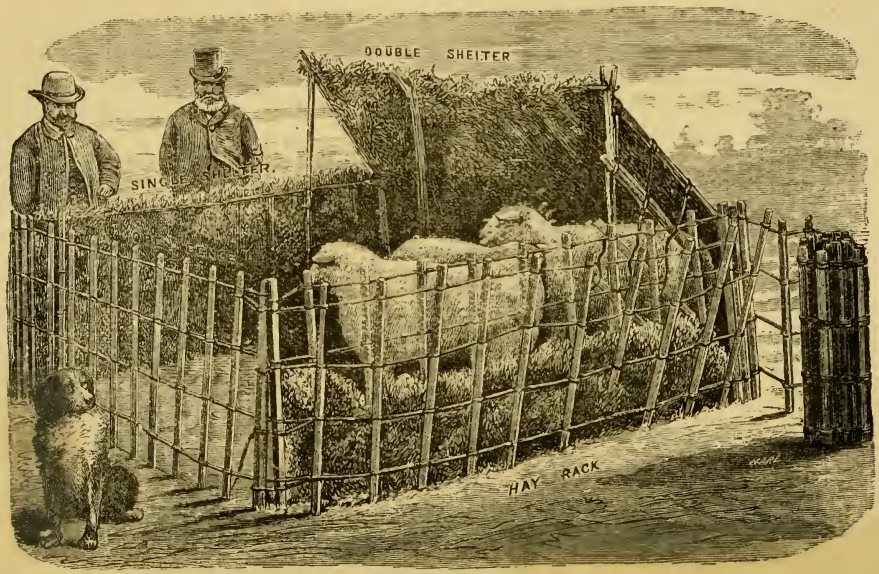
lambs in the field in the day-time (we suppose the flock to be yarded at night), and in such cases the offspring will always be found much hardier than those that are yeaned under cover. The flock should be kept in the field each day as long as possible, unless very untoward weather should prevent, and only the most tempestuous wind, accompanied with snow or rain, should induce the shepherd to keep his ewes in a close yard all day, for fresh air and exercise are so essential. Again, if the weather is pretty good, we prefer the lambs to go out the day after birth into a warm paddock; and if placed in separate pens each night for four or five nights, they will at the end of that time be ready to draft farther afield. The flockmaster has several things to keep in view; first, the kind of weather prevailing; second, how far his flock is by breed and constitution capable of enduring hardships; third, to be ready at an hour's notice to prepare against the bitterly cold storms that so often come on with little warning about the time of the year when sheep-yeaning is in full progress.

The ewes' food at this season should consist of a little sweet green hay, given night and morning. By green hay we mean such as bears much the same colour that it bore in the hay-field. The hay should neither have been exposed to rain in the field, scorched in the sun, carted in too soon, or heated in the stack. Good sheep hay gives off the same pleasant aroma as newly made hay in a fine season. Fodder for sheep should be cut in June; if allowed to grow too old it is woody, innutritious, and indigestible, and will be rejected by the flock unless they are very short of other food. A little corn, too, may be supplied. Oats are the most

approved kind, being nutritious and good milk-producers, and not tending to heat the system. The last-mentioned evil should above all things be guarded against, lest in cases of hard times in lambing, inflammation would be encouraged. Cow cabbage should be supplied liberally where it is at hand, and swedes and mangel wurzel will also form wholesome food. In spite of every precaution, the shepherd will frequently find the newly born lambs at times ailing. One golden rule, never to be lost sight of, is to give them a little milk as soon as they are yeaned; this milk should be given from the mother, and not, as is sometimes done, from milk taken from the cow. An early meal of milk gives the lamb strength to endure any hardships that it may have to face. The lamb will invariably be found to suck freely as soon as yeaned, but if it misses the teat at that time it is often afterwards only made to suck with difficulty, and sometimes all endeavours prove futile. Occasionally lambs are found suffering much from exposure. In this case two or three teaspoonfuls of gin and warm water will soon revive them. The sufferers should be removed to a fire as soon as possible, and in carrying them, their backs should be placed to the wind, while if they are borne up in the arms, so much the better. Strong cold winds are more injurious to the young animals than almost any other weather. Nearly every day in the lambing season either ewes or lambs call for some medicinal aid, and the wise flockmaster will always have at hand the gin bottle for the lambs suffering from cold, castor oil for the costive ones, and gruel, &c., for ailing ewes. A good tonic for a delicate ewe that is off its appetite is from one to two drachms of gentian and one-third of an ounce of

ginger, to be given in gruel twice a day for several days.

Every year there are lambs whose mothers die, and, on the other hand, mothers which lose their offspring. In such circumstances the motherless lambs are put to the ewes that have lost their young. This is generally easily managed by confining the ewes and lambs together in a small pen for a few days. Sometimes it is found needful to put the skin of the dead lamb on the living one to cause the ewe to gain an affection for it. It is better, however, to avoid the clothing if possible, as the lamb is liable to take cold after the skin is removed. The younger the ewes the more easily they take to the lambs, but in all cases the shepherd should keep a sharp eye on both the lamb and ewe to see that mutual affection arises. In other instances it is found necessary to give the lambs a little cow's milk until the mother's becomes more plentiful. Although milk from the cow is given to make up for any deficiency there may be, it must always be borne in mind that ewe's milk is best suited to the young lambs, and should be obtained when practicable. A little sugar added to cow's milk makes it much more wholesome for lambs, and of course the richer the milk the better. As fast as the lambs get strong enough, they, with their mothers, should be drafted on to some fresh "seeds" or grass pasture, when the generous food will force the ewes' milk, and the lambs will grow rapidly.



The above illustration exhibits a most excellent Sheep-Fold Shelter for the lambing yard, or elsewhere. It is quickly erected, easily moved, cheap, and affords good shelter. Messrs. M'Kenzie and Sons, Ceres Ironworks, Cork, are the makers.

Emasculation and Docking.

Both the above operations are usually performed at the same time, and with ordinary precaution there is little risk of evil results. We have castrated at pretty well all ages, and have seldom had a death occur from it. Lambs are, however, more often allowed to get too old before the operation is performed than being treated too early. We have known castration accomplished almost as soon as the lambs are dropped, but, taking all things into consideration, we should advise that the operation be performed between the age of a fortnight and three weeks. Some regard should be had to the weather, a dry atmosphere being essential, and if it is mild as well, so much the better. Still we have seen more losses from farmers being over particular about the state of the weather (so that the lambs have got too old), than from the work being done in rather untoward weather but in season. It is better that the work should be got over in the morning, and then the flock can be inspected several times during the day. A strong handy man should hold the lamb to his shoulder, clasping the legs, while a proficient shepherd will open the scrotum with a knife, and either draw out the testicles with his teeth or with nippers. The latter can be made by any country blacksmith, if proper directions be given him. It is not necessary to dress the scrotum, neither is searing needed. After the testicles have been taken out the ear is marked, the tail cut, and the animal released. We prefer the dock left about two inches long, but in Scotland and bleak situations it is found prudent to

leave it much longer, to prevent exposure of the hind-part to the piercing cold winds of winter. A short time after the lambs have been operated on, the shepherd should walk quietly among them, putting up those that are lying down in unnatural positions or such as seem unwell. Excessive bleeding takes place in very exceptional cases, and in such instances cold water should be applied freely to the part. If the bleeding does not then shortly cease, the better plan is to kill the animal, or a greater loss may result, but as a rule not one in a thousand dies.

The tails on the Black-faced Scotch mountain breeds are left nearly or quite full length. The Cheviots are usually left about half tails, while in all the Midland Counties of England it is the custom to leave about two inches. Still, on some English breeds scarcely any dock is left, but this is a reprehensible practice, and the very part that the butcher is so fond of clasping to ascertain the fatness of the sheep is removed. To take away such a point is really to disfigure and lower the value of the animal, and, besides, might otherwise lead to injury.

Our readers might inquire why the tails are cut at all, more particularly as both in Wales and Scotland many flocks are not docked. The operation is performed to prevent attacks of maggots, but the Welsh sheep are so active as to prevent the flies from attacking them, while the Scotch sheep in their native land need nothing near the attention that our heavier bred English ones do. It has been a matter of dispute whether lambs that are made off fat are better docked and castrated than not. To settle this question, we operated on part of a flock and allowed the others

to remain entire. The result was that the butchers selected those that had been castrated for choice. It was found that the tup lambs were what the butchers termed "raw" on the backs, *i.e.*, lacked flesh there. Some were sent off at the early age of two months, and here we were much surprised to find the castrated lambs displayed the best points.

A docked lamb is more admired by the butcher, inasmuch as the hind-quarters look rounder and more developed, and the tail is more plump. Later on, as the long tails are apt to encourage maggots, clipping often is resorted to, and the lamb is disfigured accordingly. These last remarks point more especially to our English breeds. The Scotch flockmasters know quite well how to treat their flocks in this respect.

Washing.

Since wool-growing has been such an unremunerative occupation farmers have been less careful about preparing the fleeces for market; in fact, in many localities washing is being altogether dispensed with. However, before this old custom is relinquished we should inquire the reason for its abolition. Is it because of the expense and trouble of washing, or the risk to the sheep, or does the wool prove as profitable uncleaned as it is when cleaned? As regards the expense and trouble: when a washpool is on the farm—and there generally is one on holdings of any considerable size—the cost cannot be computed at more than a few pence per head. The sheep have to be penned at such a season to receive

a general clipping, or possibly maggoting, thus the extra trouble of taking them to the washpool is scarcely worth mentioning. Next comes the question of risk: this, with ordinary precautions, is next to nil. We have washed from five hundred to a thousand sheep annually for many years, and have not had on the average one animal drop from the process. Out of such a large flock it is only reasonable to believe that an occasional death may have been caused through disease, and that the washing but slightly hastened the end. On the other hand, sheep derive benefit in many ways from their bath.

With regard to the question of clean or unclean wool, we certainly hold the former as the most valuable. Some dirt is sold in unwashed fleeces no doubt, but our readers must bear in mind that a sheep after being washed has the pores of the skin well opened, and consequently perspires more freely. It is unwise to have the flock shorn until a certain period after washing, and during all of which intervening time perspiration goes on freely, and the wool weighs better accordingly. The fleece can always be most conveniently washed on the sheep's back. Of course the wool has to undergo a further cleansing when in other hands, but it is most essential to a good sale that the farmer should make it bright and clean. The purchaser will always pay well for a fleece which is clean, neatly bound, and that displays that lustre which is so much admired. The custom of sheep-washing dates from a very early period, and although much unnecessary labour is sometimes expended for a considerable time in many branches of industries, yet this custom of at least two thousand years' standing must not be cast aside without due consideration. Macaulay, whose classical training was

calculated to make him an authority on ancient customs, writes in his "Lays of Ancient Rome:"—

> "The harvests of Arretium,
> This year, old men shall reap;
> This year, young boys in Umbro
> Shall plunge the struggling sheep;
> And in the vats of Luna,
> This year, the *must* shall foam
> Round the white feet of laughing girls
> Whose sires have marched to Rome."

"This year," in figures, is 360 A.U.C., which, by our reckoning, takes the custom of sheep-washing back to about 390 years before the birth of Christ!

It may further be mentioned, anent the knowledge of this *ancient* custom, that the Pool of Bethesda (probably north-east of Jerusalem), which stood near a sheep-gate or market, was called by the Jews "the Sheep Pool," and that sheep were driven into it and washed in due season.

As to the truth of the two statements. Lord Macaulay's eighth stanza of *Horatius* (quoted above) is based, in common with the whole "Lay," on the writings of Livy, Niebuhr, and several other ancient and modern authors, and may be accepted *in toto.* With reference to the correctness of the second argument we shall point out that the Apostle St. John[1] speaks of the Pool of Bethesda in connection with his discourse on Baptism and Conversion, and narrates the superstitious belief of the people concerning the "healing qualities" of the pool in order to point out to Christians that they, the sheep (so-called), must be washed in the

[1] St. John v.

Bethesda of God (*i.e.*, the Waters of Baptism) before they become clean and free from sin. The reason for introducing this argument and proof in this place will be plainly evident to all. Religious instruction was imparted by means of parables in those days (and what is this but a parable?), and the apostle's meaning may be thus expressed:—As sheep (speaking literally) are washed in the Pool of Bethesda of Jerusalem, so also must sheep (speaking figuratively) be washed in the Pool of Bethesda of God.

We shall not endeavour to continue the argument, for this book is not written in a controversial spirit. With one more point we finish. In Yorkshire (about four miles from Hellifield) there is the remnant of a Roman wall, which is built in circular form, with a doorway of about three feet wide, and it is evident, from the hollowed-out space which it encloses, and the grass-grown channel which connects it with a now almost dried-up brook (or "beck"), that sheep-washing took place here fifty years before Christ.

Of course, the ancient method—in actually washing the sheep—differed somewhat from the modern. It was formerly (and is still, we believe, in some parts, Yorkshire especially) the rule that as many as could be were driven into the enclosed pool at one time, and subjected to a drenching at the hands of the washers by means of vessels filled with water. This proceeding, coupled with the struggles of the sheep themselves, no doubt proved effectual, but it is a method to be condemned. Still it does not matter so much whether there is any difference in the *modus*, so long as all agree in the *operandi*, of sheep-washing.

We have before spoken of the slight risk in washing

sheep, but we can by no means vouch for the *little* loss if the necessary precautions are not taken. The flock should be driven slowly to the washpool, and stand at least two hours before washing commences. This time may be partly taken up in clipping all dirty locks, removing thorns, paring feet, and such like work. If sheep are hurried to the pool, and thrown in at once, while their bodies are overheated and their stomachs are overloaded with food, the risk of mortality will be increased considerably. Neither is there any occasion for such despatch, as several flocks may be folded off their pasture to receive the necessary washing in turn.

The following is an approved method:—Two men should be employed to cast the sheep into the pool, otherwise the animals are "mauled," and sometimes seriously injured. Each man should lay hold of the sheep firmly under the neck with one hand, while the other two hands should meet and clasp each other firmly under the animal's belly. In this way it is easily lifted from the ground, and cast hind-part foremost into the pool. It is desirable that the sheep should be dipped quite under the water when cast into the pool. Washing-places are constructed on different plans, but the usual one is to have a pole across the centre. The sheep are allowed to swim for a short time on the side of the pole in which they are cast into the pool; then, when the wool has been well soaked, they are put under the pole to a spout running with clean water, where the shepherd casts them on the back to well clean the belly. Then, after otherwise giving them a good dabbling, he lets them make their exit by a gangway leading out of the pool. The sheep, after being washed, should be removed to a clean pasture

where they cannot soil their wool. Lambs are sometimes washed and shorn, but we do not generally approve of the practice. The washing season varies in different localities, but, taking the centre of England as a criterion, the last week in June is the proper time.

Shearing.

Sheep-shearing has until late years been looked upon as a second harvest. At present, however, wool, in common with many other products of the farm, has so fallen in value as to produce but little towards rent. The low price no doubt may be attributed in a great measure to the vast importations from abroad, chiefly our own colonies, several of which within the memory of the writer had scarcely been trampled by a sheep, but now send into England large quantities of wool and mutton. Notwithstanding all this, the home produce from the sheep's back is far too valuable to be lost sight of, and it behoves breeders to look to the support of wool, and to take care of it when ripe for clipping. As we write prices are hardening, and ere another shearing day comes round, fair value might be obtained for fleeces of good quality.

Shearing in England usually begins with the month of June. There is a certain season when wool is ripe, and that is the precise time to remove the fleece. Our home-bred sheep would shed their fleeces once a year if left to take their chance, but there are some foreign breeds that do not cast off their coats annually. The old saying is, that "when the elder's white, the wool is ripe." This, however, is an unreliable sign, for climatic influences have a more varied effect upon the

elder plant than upon the sheep's fleece. The wool is ripe when it is mostly raised or parted from the skin, and only a small percentage of the fibres need severing by the shears when thus properly matured. The shepherd has a vast deal more trouble in shearing sheep early for market than he has in cutting off the coat at the proper time. In our colonies shearing is conducted on a large scale, and our clipping work at home, as compared with the Australian ranchmen's shearing, is a light task indeed. No sheep-owner in Britain shears more than a few thousand, but some of the Australian "squatters" shear as many as 250,000 in a season. Shearing takes place there in November and December, and for the above-mentioned large flock, one hundred shearers would be employed, besides fifty or sixty helpers, there called "rouseabouts" and "musterers." The shearers are paid about two shillings per score, while the "rouseabouts" and "musterers" are paid an additional sum. It is estimated that the total cost of shearing 250,000 sheep would amount to £2000. The sheep cut about 5 lbs. per head; thus one sheep run produces something like five thousand tons of wool in a year, which at an average price would realise at market £60,000, and would require one hundred and fifty waggons to convey the bales to the nearest railway station. Where such enormous numbers of sheep are shorn, it is obvious that a steam clipping-machine is much called for, and an unsuccessful attempt was made a year or two ago in Melbourne to bring one into work. It is likely, however, that before long such a machine will be made to answer.

It is best in this country to let a week or ten days intervene between washing and shearing, so that the

wool has time to absorb a good amount of perspiration, which adds materially to the weight of the fleece. Cold days are not propitious for shearing; the wool is dry, and therefore not only weighs less, but cuts badly. The experienced flock-keepers like to shear on a hot day, and to get the men to do the work in the sun rather than under a shady tree or in sheds. The flock intended for shearing should be brought home early in the morning, before the animals have loaded their stomachs with food. They will then need to stand about an hour to rest, and to allow the wool to get dry. To shear sheep immediately they have been hurried into the fold, and with their stomachs overcharged with food, is a most reprehensible practice, and one that frequently leads to sudden deaths. We have seen several instances of sheep dying under the shearer, or shortly after they have been set at liberty. In nine cases out of ten these deaths occur from the sheep's stomach being overloaded.

It is the practice of some to shut the sheep up in a dry shed overnight, but this is not an approved plan. They get too empty, and, their skins consequently being loose, the shearer cannot get on with his work, and, moreover, is more likely to cut the sheep in the process of shearing. It is wise not to be under-manned in the shear-yard. About four shearers, and one help to fetch out sheep and wind the wool, will soon get over the ordinary sized flocks of this country. Of course in Scotland, and even on the spacious Downs of England, more hands are required to get the work over in due time.

Barns, hovels, and other enclosed sheds are sometimes used for shearing in, but unless untoward weather

necessitates shelter being provided for the flock, all such places are best avoided. Folded under some large shady trees the flocks can stand in comparative enjoyment compared with the close atmosphere of enclosed buildings. Then, as regards shearing-ground, stone, brick, and board floors are all to be condemned. The velvety greensward is the softest and most comfortable situation for sheep to recline upon while being shorn, and here they rest more quietly during the process. The poor animals cannot rest on hard and uneven surfaces, and in their struggles for a more comfortable position, they often get cut, besides which the shearer often loses his temper, and further injures them. The master should always keep a sharp look-out for any abuse that may be going on, and if a shearer wilfully illtreats any sheep, he should be at once discharged from the shearing-yard. To injure any dumb creature is one of the most cowardly, brutish, and unfeeling of acts, yet if our poor animals of the farm could only speak, they would many a tale unfold of cruelty and wrong.

Different methods of shearing are followed in various localities. In some places the shearers stand in holes in the ground to save so much back bending; in others, the sheep are laid on raised boards; but by far the most commendable plan is to place the animals on some level turf, as is the common custom in England. Just as there are various positions for placing the sheep, so there are a variety of methods of shearing. The following is, however, the most approved plan. Everything being arranged, a shearer takes hold of a sheep and sets it on its rump, and it is kept in that position by resting against his legs. He first removes all straws,

thorns, burs, or other things which may have adhered to the wool. In this position it is removed from the head, neck, and brisket (as far as the shoulders), and usually the thighs. The head of the animal is then bent down sideways, and its ribs on one side are curved round. This position is maintained by the shearer placing a leg on each side of the neck of the sheep, and pushing out the opposite ribs by pressing his knees gently against the ribs nearest to him. The wool is then shorn from the far side by the left hand of the shearer, by using the shears from the abdomen to the middle of the back down as far as the loins. The sheep is then laid flat on its side, and kept down by the shearer resting on his knees on the ground and placing one foot over the neck. In the position which the animal is kept down, the left hand shears the wool from the near side of the hind-quarter. The other side is then shorn with the right hand, and the animal set at liberty. The shears in using should be held close to the body of the animal, with their points, which should be slightly blunted, a little elevated. Every stroke of the shears should be short and narrow to make a clean clip. The clips of the shears appear in concentric rings round the body of the sheep. The oil of the wool makes the shears clip smoothly, and they should be kept sharp. All cutting or wounding of the skin during the shearing must be carefully avoided, for even the smallest wound will afford the flies an opportunity for lodging their ovules, and thus produce maggots, which may cause much inflammation. The teats of the female are a tender part, and the belly must be shorn with double caution. A finger placed on the former will protect them. A little

tar, resin ointment, or sheep salve, or even carbolic soap, will protect and soothe a wound. A moderate workman will shear about thirty sheep per day. This work should always be neatly done, and beginners must only be allowed to shear parts of the animal until accustomed to the work. Evil often results from keeping a sheep too long in one position.

The wool should be neatly bound, but if a clever workman is employed there is no need for a professional wool-winder. Lamb shearing has never been much practised, and it is less than ever desirable to shear these animals now the price of wool is so low. Howbeit, the wool from lambs is of the finest quality, and as the price gets higher some of the long-woolled kinds might again pay well for shearing. If, however, the farmer finds the constitution of his flocks weakened against winter by shearing, he had better refrain from clipping them until the following spring. Lamb shearing does not take place before the middle of July. The work must not be driven off till too late in the summer, or the animals will not assume a sufficiently warm garment by the time tempestuous wintry weather comes on.

Weaning Lambs.

More cautious treatment is needed than is usually bestowed upon the flock at weaning time, for it is the most critical period in the life of lambs; but from the fact that the young animals can then luxuriate on abundant pasture under genial summer sun, all anxiety with regard to them is set at rest. Notwithstanding this, at such a time they need the greatest care. The rich milk of the mother being suddenly withheld is

sufficient to cause an adverse change in a lamb's improving condition, and a check at such an age and season is with difficulty corrected before winter. A calf or a foal can be weaned by degrees, but such a method is not practicable with lambs. By examining the painfully distended state of the sheeps' udders a short time after the lambs have left, it is seen how rich a supply is still produced for the offspring.

Before the lambs are weaned they should be accustomed to take a little dry food, and as soon as their mothers are removed a full supply should be given. Several of the purchased Lamb Foods are toothsome, wholesome, and nutritious, but, failing a supply of these, oats and cotton cake may always be given at the rate of half a pint of the former, or half a pound per head of the latter. Furthermore, a young sweet pasture should be ready to receive the lambs by the time they have forgotten their mothers, and the more land they have to run over the better. It is not desirable that the pasture should have been grazed by sheep during the same season, or some parasitic pest may have been left behind which might prove most destructive to the young flock later on in the year. Many a good flock has thus been reduced in numbers. Dry sound land is essential, and "seeds" or new turf after the first year of grazing is excellent for the young animals. Sound aftermaths are also good, providing the grass has not been allowed to get too long. Very rich old pasture land is not quite suitable until nearer winter: the herbage is too coarse and long; but such sweet blades as spring up in the winter season are good and nutritious, and are eaten with infinite relish.

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flocks until winter, but the seeds of disease are sown between weaning time and late autumn. Flesh being lost at that time, no sooner do the lambs have to endure the hardships of winter than their weak constitutions prove unequal to the task, and mortality follows at a rapid rate from one or other of the diseases to which the animals are prone. It very often happens that the grazier has a number of fat sheep and beasts to get off in the autumn, and they are given the best pastures, while the lambs, at the very time when they need most nourishment, are put on one side in any bare overstocked fields. Lambs that are wintered on swedes are most likely to do well; and although palpable neglect may have been shown between the period that they were weaned and the time for stocking the roots, if the young animals once take to their new food but very few deaths result. When weaning takes place, which is usually in July, the ewes should be taken from their offspring, not the offspring from the ewes. The latter should be shut up in a yard sufficiently far from the youngsters to prevent both mothers and young hearing each other's call. The scantier the ewes' food for a few days, until their milk goes, the better; and such udders as become painfully distended should be once or twice milked out. When this latter precaution is neglected badly inflamed udders occasionally occur, causing the poor ewes excruciating pain, and calling for medical treatment.

"Shepherding."

A good shepherd is a servant no flockmaster should be without, for it greatly depends upon the shepherd

whether the flock shall be a gain or a loss. It is only a clever, honest, kind, and industrious man who can well fill such an office, and many labourers who may take the greatest pains cannot become good shepherds for lack of natural aptitude or of one or other of these qualities. The requisite qualifications for this post seem to be innate in certain men. Some are calculated to make good waggoners, others are good "all round" labourers, while a few are gifted with the ability to make clever mechanics; but none of these men would probably be good care-takers of a flock of sheep, although they might serve a long apprenticeship and apply themselves assiduously to their work. On the other hand, there are some who are, as it were, born shepherds. These latter quickly become *au fait* at the business; and either in the lambing yard, in the shearing fold, in the pasture, or on the wild desolate Downs, they are competent, after but little instruction, to attend to all the requirements of the ovine race. In fact, give an apt youth a few years with an old hand, and he will soon be able to take the responsible office of shepherd. Industrious every shepherd must be; for although at many times his occupation may be a light one, there are other occasions when he needs to work hard, and spend many extra hours with his sheep. It often happens that when the most bitterly cold weather prevails he is needed among his flock both day and night. The man will never make a proficient shepherd who does not take an interest in his work, and feel as much anxiety as his master with regard to the flock under his care. He also needs to be tolerably skilled in surgical operations, and it is marvellous how soon some men become experts in such work.

A man who understands his work will get over it in half the time a novice would; and not only that, but do it better. We have ourselves had much personal experience in shepherding, and can therefore detect the shortcomings in others. The pastures should be entered in a quiet manner, and a general survey be taken to see if anything is amiss with any of the animals. Should there be, whether it be sheep or cows, some symptoms will easily be detected even at a distance. The sheep may perchance be isolated from the flock, or be standing or lying in an unnatural position. This is, of course, best observed from a distance. If the careless shepherd rouses the animals with a noisy sheep-dog, both hale and suffering sheep become mixed in the excitement which ensues, and early indications of some perhaps malignant malady are overlooked. The result is, that probably upon the next visit to the field the sufferer overlooked previously will be dead, or the disease so advanced as to be past cure. It may be some infectious complaint, and before the animal is removed a large portion of the flock may become contaminated. Thus the larger part of a shepherd's yearly wage is lost by neglect or ignorance. When the shepherd notices anything unusual about one of his flock he should walk very quietly towards it, for the animal may not have become tame, and upon a near approach it will be proved whether his first suspicions were well founded. Rumination will have ceased, a sadness will be observed about the eye, the ears will be almost sure to be placed in some unnatural position, and, whether standing or lying, the sick animal will display many peculiar signs of distress that will quickly strike the eye of an acute observer.

The sheep may only be suffering from an attack of foot-rot, maggots, or some other of the minor disorders; but, on the other hand, as before remarked, it may be displaying the first symptoms of a deadly and infectious malady. It is most essential that the slightest indication should be taken as a warning. If observed at night, the animal must not be left till morning for more pronounced symptoms to declare themselves. The shepherd too often thus delays, and then in many cases he might as well, on his next visit, take the wheelbarrow for the carcase, many of the diseases to which sheep are subject taking such a rapid course.

Upon the first indication of sickness the patient should be carefully removed to a paddock or other convenient place, there to be at once treated as the disease requires. With proper medicines at hand, and prompt action, there will be every chance of effecting a cure, and in case of infectious maladies the best steps to prevent further attacks will have been taken. The chances of detecting early indications of illness are very remote when injudicious use of the sheep-dog is allowed. On hundreds of farms at the present day the shepherd either sits on the gate that enters the field, or walks a few yards into the pasture, and sends the noisy random cur round the flock. The latter are brought racing to the feet of the idle servant, who inspects and counts them, and then passes into another field to repeat the same reprehensible practice.

Pray, what chance can the cleverest man have of finding out any first symptoms of illness when such is the method of shepherding? How is he to detect the slightly laboured breathing, the saddened eye and

dejected look, that first indicate inflammation of the lungs, and many other commoner but malignant maladies, when the whole flock are jostled together and are apparently all alike excited? Even a slight attack of maggots, which may be a most serious one shortly, is overlooked. Foot-rot is also unobserved, inasmuch as the poor affrighted animals forget their lameness in the excited state into which they have been worked. Again, such treatment is neither conducive to the health or fattening of the animals. The sheep, by nature, is a wild, timid creature, but with kindness under human subjection it becomes well domesticated; howbeit, under a careless shepherd, it often returns to its natural timidity.

A well-broken sheep-dog is indispensable on the spacious Down lands of England, and on the wild hills of Scotland and Wales; indeed, in any unenclosed country. This animal is also useful at times even in enclosed pastures, and when sheep are on a journey; but, as a rule, in small fields a dog should not be used, except for folding purposes.

It is essential that sheep should be visited twice a day at least, and the further apart these visits are the better. In summer, when the animals have often to be driven to the pen for maggoting and other purposes, this folding should not be done during the heat of the day, as the high temperature tends to injure the flock. It is indeed impossible for a shepherd to attend to his flock properly when the sun is in full summer force. Immediately the slightest lameness from foot-rot is observed, the afflicted animal should be parted from its fellows, and its feet properly pared and dressed before it imparts the disease to others. No dirty locks should be allowed

to adhere to the sheep in the maggot season, or the fly will be sure to make its attack, and maggots will be the result. The wise shepherd will endorse the maxim that "prevention is better than cure." Wholesome water should be attainable, and the fences should be kept in good order. Sheep would not then acquire the habit of straying. The dog should never be allowed to visit the yeaning yard or the heavy pregnant ewes, a man or lad being provided to assist instead. The medicine chest should be at hand both day and night, but the master should be consulted before any but the most ordinary kinds are used. Small quantities of mixtures for foot-rot and maggots should be placed at each pen, so that when the sheep are folded they can be dressed at will. In conclusion we feel sure that flockmasters would save much by looking more closely into the practices of their servants, and the requirements of their flocks generally.

We omitted to state that the shepherd should always be prepared to slaughter any fat or meaty sheep that is ailing. The first loss is often the least, and at the commencement of most complaints the animal's flesh is wholesome for human food, and thus the ailing sheep is worth pretty well as much dead as alive.

Sheep as Fertilisers.

No other farm animals can compete with the ovine tribe as fertilisers, and it has been well said that sheep tread with golden feet. Throughout the last decade of depression in farming these animals have been the only bright star that has illuminated the husbandman's

horizon. Consequently when the great sheep-rot broke out about six years ago, and lasted through several successive seasons, it seemed as though the last link in the chain of profitable farming was snapped asunder. Still, even the farms where the sheep were totally exterminated by the pestilence have in some way or other been fully restocked. The last official returns, however, revealed a deficiency of something over a million head. This, however, is easily accounted for from the fact that at the latter end of the year 1884 sheep that would have been preserved as stock, had winter keep and money been more plentiful, were disposed of for slaughter in thousands.

Soon after the first introduction of the swede into Britain, about the middle of the last century, it was discovered that it was a most valuable fertiliser of the soil through the agency of sheep. On all the lighter lands of England the flocks prove most valuable for eating on the roots, giving the land a rich manuring, and consolidating the soil for the following barley or wheat crop. Indeed it is almost impossible to keep such land in a high state of cultivation without the agency of sheep. When between the hurdles these animals should be fed liberally with corn and cake in addition to root food. Notwithstanding the low price of grain, cake is the cheapest diet for sheep, more especially cotton cake; a variety of food is, however, best for the animals. By feeding them generously on roots the farmer is repaid in wool, mutton, and the rich fertilisation of the soil. The fold should be carefully moved, so that the whole of the field gets an equal benefit from the excreta of the sheep, also an equal trampling.

White turnips, cabbages, rape, and all the brassicca genus of plants may be made rich fertilisers by the agency of sheep. Cabbages are most excellent food for ovine animals of any age and in any condition.

"Seeds," that is, mixed clovers and grasses, might be turned to much greater profit by many farmers if they would leave the land down three years, and graze it hard with sheep, meanwhile feeding the animals liberally with cake and corn. After such treatment the ground, when broken up, would be fit to bear any crop in abundance, and the heavy carting of farm-yard manure being dispensed with, that dressing would be available for other portions of the land.

Vetches might be grown to advantage far wider than they are, and if prudently stocked with sheep would provide an abundance of feed before the old pasture land became luxuriant. Vetch crops can be often grown on land that would otherwise be idle in winter and spring. These plants utilise manurial properties in the soil that might otherwise be washed into the drains, while the crops can be got off early enough to allow of the land being worked about and planted with roots. Indeed, the light soil farmer may always hold his fields in good heart if he will keep up his sheep-flock, and provide cake and corn with a liberal hand.

On grass pastures that have been grazed unevenly with cattle, or where the turf shows but a poor face, sheep are the animals to improve it, providing they have, both in winter and summer, a good supply of trough food. It is unwise to repeatedly graze thickly

with sheep, as in such a case there is a risk of disease breaking out; but if the fields have enjoyed an immunity from these animals for several years, two or three seasons hard grazing will benefit the pastures and do no harm to the flock, if the troughs are systematically moved.

It is the practice of some flock-owners to fold sheep in yards to make manure. This is a reprehensible plan, and the flocks will not long remain healthy if thus confined. They love fresh air, and an open field affords them this, and thus none of Nature's laws are broken. Every one who has walked through a crowded sheep-fold, has perceived how strong an odour is given off by the animals. This is supposed to be wholesome for human beings with weak chests; but, however that may be, it is decidedly unhealthy for sheep to inhale the breath and effluvia of their own kind.

The custom of using sheep to graze off winter-proud wheat in the spring has in many districts gone out of favour. This may in a great measure be attributed to the inclement winters that have lately prevailed, and also to the modern invention of a number of useful rollers and artificial manures. Still, the custom of eating off this cereal can be traced back in history as far as the days of ancient Rome. Pliny, the best authority on agriculture at that period, speaks of grazing the wheat with sheep. But, as he was a Roman, he doubtless alluded to the crops in Italy; indeed, he quotes from Sophocles the Greek poet:—

"And Italy, a land [I say] so happy and so blest,
Where stand the fields all hoar and grey with white wheat of the best."

In such a genial climate as Italy, wheat would be much disposed to run to straw, and it would consequently be wise to graze it with sheep.

On winter-proud wheats, sheep may be put with the following advantages:—The animals take off every blade of wheat close to the surface of the soil, yet do not injure the leading shoots; they greatly consolidate the soil; they give the field a light fertilising, and they find feed at a time when the pastures are mostly bare. Howbeit the grazing must be done with despatch, not more than ten days or a fortnight being allowed for the eating-off process. When this method is carefully carried out, the plants afterwards grow freely, and a rich harvest of heavy heads is reaped.

Without devoting more space in our volume to this subject, we may conclude by saying that in all civilised lands, in all ages, sheep have been of incalculable value for their fertilising qualities alone to all men associated with land.

Ergot in Grasses.

Ergot is a parasitic fungus which attacks most kinds of grasses, from the wheat, the head of the grass family, to the humble fiorin, whose seed is scarcely visible to the naked eye. On the Continent this pest is found largely on rye, and is called by botanists *Secale cornutum*. On damp soils, which suit it well, it is there grown for medicinal purposes, when the rye seed is sacrificed for the sake of the ergot spurs.

Balfour, a celebrated botanist, observes:—"Ergot is a monstrous state of the grain in which the enlarged

and diseased ovary protrudes in a curved form, resembling a cock's spur; hence the name, from the French *ergot*, meaning a spur. The ovary is black externally, spongy internally, and contains much oily matter. Some consider it is produced by the attack of a fungus, which induces a diseased condition in the ovarian cells. The disease is usually met with in rye, and the name of 'spurred rye' is applied to it."

After Balfour wrote upon this parasite, some years passed by without any one taking up the subject, but it had already been discovered that it had most poisonous effects upon human beings, as well as upon the lower animals. The former sufferers were chiefly in France and Germany, where bread was largely eaten made from rye flour in which ergot spurs had been ground; and, such being the case, it is not to be wondered at that most serious cases of poisoning frequently occurred. Persons so suffering experienced terrible agony, and the malady was termed ergotism.

The symptoms were dryness and irritation of the throat, salivation, thirst, burning pain in the stomach, vomiting, colic, and often diarrhœa. The brain was always more or less affected, and such stupor and giddiness resulted that the patient had the appearance of being intoxicated with strong drink. Gangrene of the extremities followed in due course, and the feet and hands would sometimes separate from the body, after which the living flesh would heal over and become sound, while black spots, livid patches, and gangrenous sores formed on the surface of the body. In some instances, when the mortified limbs were amputated, the disease would advance to the trunk, and the sufferers would die miserable deaths. Five hundred patients

were at one time under treatment for ergotism in one hospital in Orleans.

It was not, however, until within the last twenty years that the British farmer was warned by fungologists of how dangerous a pest was lurking in his pastures. We have ourselves made an especial study of this poisonous parasite, and are grieved to say that those whom it most concerns have been slow to benefit by the information and warning that has been laid before them. Much has been written by us, both in journals and books, while we have further tried in conversation, on innumerable occasions, to convince the unconvincible. At last we are glad to see that other practical writers are coming to our assistance. In the last issue of the Royal Agricultural Society's Journal an exhaustive report was contributed by an eminent and practical writer corroborative of what we have previously written and said upon this important matter. Our brother pastoral farmers in America appear to have suffered far more heavy losses than the British graziers, and in the year 1884 cases occurred of a most malignant character. To these we shall refer further on.

Until within the last few years it was considered by graziers in the United Kingdom that the only losses to be feared from ergot were from abortion in animals of the farm. It has been for some time an established fact among scientific men that the spurs in grasses, &c., caused such disorders in the mare, the cow, and the ewe. The fungus has a specific influence upon the walls of the uterus, or womb, causing contraction of that part, consequently bringing on abnormal pains and unnatural labour. In natural labour the pains are of a spasmodic nature, but when the irritation is set up

by ergot, the pains are continual. Still, the desire to throw off the fœtus is equally great in each case, therefore when the pregnant animal has partaken of the poisonous parasite, premature birth is likely to follow; indeed, a comparatively small quantity taken at an advanced state of pregnancy is sufficient to cause the mischief.

As regards the quantity needed, from experiments tried on many different kinds of animals, such as the mare, cow, bitch, rabbit, and cat, a tolerably true estimate can be made; for ergot is commonly used by the veterinary surgeon, and not infrequently by the human surgeon, to hasten parturition when the pains or throes are languid.

Mr. George S. Heatly, M.R.C.V.S., and a well-known author of the present day, advises the following doses of ergot to hasten birth. When the animal has been in labour for a prolonged time, for the mare and cow from half an ounce to one ounce; for sheep, swine, and bitches about one drachm. These doses should be repeated every half hour, and it ought to be given in the state of a watery infusion, tincture, or liquid. The above author refers to the ergot of rye, *Secale cornutum.* Still, it is proved that ergot of rye and ergot in all our common grasses is exactly the same species of fungoid plant, and contains the same medicinal or poisonous properties. Bearing in mind that a small dose is so active, it is clear that when the spurs abound in the daily food of the cow or ewe the result must be malignant. From personal experience, extending over two decades, we can vouch for many cases of abortion arising from the cow and the ewe partaking too freely of ergotted grass, but not near so many cases have transpired

in the sheep-flock as in the cow-herd. It is only in the early breeding districts that the ewes become sufficiently forward in pregnancy to abort before most of the spurs have fallen to the ground in a state of maturity; when shed they are tolerably safe from either sheep or cows, *but equally safe to reproduce the following year.*

When animals abort from taking this poison, it is usually at the time they are rather far advanced in pregnancy, say from half their time until the period for natural delivery is accomplished. Therefore neither cows nor ewes should be allowed on ergotted pastures during the latter period of gestation. If the fœtus is small in the uterus, which is the case in the earlier stages of gestation, the contraction of the walls of the womb do not press upon the young to the same extent as when the fœtus is larger.

We ourselves had until lately little fear of anything worse than abortion occurring from animals taking ergot (and these cases have become more common with each succeeding summer). Still, from some cases we investigated in Ireland during last autumn, it was clear that outbreaks of ergotism [1] among sheep and lambs had become known. Having written a report last July to a well-known Irish farming journal upon the deadly influences of this parasite, and having given a full description of the symptoms shown by animals attacked, a correspondent of the paper referred to, finding his sheep and lambs dying in a mysterious way, compared the symptoms of the suffering animals in his flock with those we had described in our report,

[1] Ergotism signifies a disease caused by ergot attacking both male and female, and often ending fatally.

and found they agreed in every particular. Moreover, upon the flock being removed to new pastures, where no spurs were present in the grasses, there were no more cases of illness or death. Seeing that the fatal cases occurred so early as July, some specimens of the diseased grasses were forwarded to us, and we found them more thickly studded with the spurs than any we had before witnessed so early in the season. Ergot does not usually develop to any extent in England until the latter end of July, and far more is found in October. The grasses, however, mature the spurs quite a month earlier under the more genial atmospheric influences of Erin's favoured isle. It is not reasonable to suppose that this one was an isolated case, seeing that the parasite and its malignant powers are so little understood even by the better educated farmers, while the uneducated until lately have known little and cared less about it. How many cases more or less fatal must have occurred which have been wrapped in mystery, but which might be rightly assigned to this poisonous pest? So it will be seen that although the spurs may not be present to any large extent in the grass during the season that the ewes are heavy with young, it does not follow that the animals will not be injuriously and even fatally affected in other ways besides being induced to expel the fœtus. Ergotism is to be feared and may occur at any time between the beginning of August and Christmas, while the grass is ergotised, or there would be danger even during winter if thickly spurred hay were given.

Even while we were recently engaged at home with our investigations, most startling information was brought over to us from America. A report was made

by the Agricultural Department at Washington of an outbreak of ergotism among cattle in Coffee County, Kansas, in March 1884, and no cases nearly so disastrous have been recorded in modern history, although the case of the Irish sheep above treated on resembles them in a modified degree. The outbreak was new to veterinary surgeons of the districts, and they at first mistook it for an attack of "foot-and-mouth disease," the early symptoms being very similar. Discharge of an excess of saliva from the mouth, and the peculiar "sucking" or "smacking" of the lips, were considered conclusive symptoms. In a short time thousands of cattle were attacked, and the stock-owners in the neighbourhood became alarmed to a most serious extent. An eminent practitioner, Dr. Salmon, found upon investigation that the malady was of a far more serious nature than the disease commonly known in England as foot-and-mouth disease, and he soon traced the cause of it to the food the animals had taken. Suspicion was first raised to the fact that it could not be foot-and-mouth disease, inasmuch as calves which partook of milk from diseased mothers did not take it. Sheep and pigs running among the diseased cows did not fall, and what was more conclusive than all, horses, which of course are never known to suffer from foot-and-mouth disease, fell victims to this strange malady.

Shortly the question was set at rest, for the symptoms of ergotism became fully recognised. Gangrene of the extremities generally occurred; a constricted band was formed round the limbs, often above the fetlock joint, and a separation was noticed to form at the upper part of the band. When this band appeared near a joint the portion of the limb below would drop

PRIZE GROUP OF SHEARLING SUFFOLK EWES. Bred by Mr. EDWARD GITTUS, Snailwell.

off, and the remaining part would quickly heal. In some instances the crack or fissure where the separation took place happened at a distance from a joint—the middle of the shin-bone for instance. These were the most painful cases of all. The disease would advance until it found a joint—it might be the fetlock—and thus the shank-bone would be left denuded of flesh and protruding from the skin.

Dr. Salmon compared all these symptoms with the records of the cases that had occurred in France and Germany many years before, and found the new outbreak to correspond therewith in a marked degree. It only needed to find ergot in the food to render the suspicions of ergotism a certainty. The deadly spurs were found in profusion in the grasses used as diet, more especially in a kind of wild rye. In many heads half the seeds, and in some every one, had been replaced by ergot. The hay, too, was found equally loaded with the spurs, as much as 12 per cent. being present.

The different states of the ergot are as follows. The spurs fall to the earth with the seed of the grass in the late autumn or early winter, ripening at the same time as the host plants. The spurs lie impervious to frost, rain, or the inclemency of winter weather. In the spring the fungoid spores throw up small bodies (from one to ten on each spur), resembling minute mushrooms. These, the first growth, are called *Claviceps purpurea.* They mature in a week or ten days, and then discharge uncountable millions of invisible spores or seeds. These are so numerous as to almost fill the air, and they alight on all surrounding objects both far and near, but only such

as fall upon the grass-bloom prove fruitful. Being needle-shaped, they quickly find their way into the section of the grasses that should develop the grass seeds; and while the plants are still in bloom they support and nourish the parasite, imparting to it such sap as Nature had provided for the true seed, and the ergot, thus nursed, soon arrives at maturity. Later on the spur has a second reproducing period called the *sphacelia* state. When the fungus is nearly fully grown, it forms an apex or snout at the end of the ergot grain. This apex abounds in spores, myriads of which are thrown off, and as they settle on other grasses ergotise them. Thus it will be seen that the first reproducing bodies are the *Claviceps purpurea*, and the second the contents of the apex called the *sphacelium* state. No wonder, therefore, that in a humid season many grasses are diseased, seeing that at two periods in the life of the ergot spores are thrown off in such profusion, and are scattered by every passing breeze.

Ergot revels in moisture in all stages of its life, and it is chiefly found, between August and December, in low-lying meadows that have not been mown, under hedges, in lanes, on roadsides, by rivers and their tributaries, on the banks of canals, round ponds, and, indeed, in all humid situations. No pregnant animal should be allowed to graze where it is seen, and where it abounds the grass may be considered injurious to all kinds of stock—a lesson that was taught us by the disastrous cases that so recently occurred in Ireland and in Kansas.

The pest is best destroyed by mowing all meadows and rough grasses, on pastures and other places where the plants are liable to be diseased, before the seed is ripened

A.—An inflorescence of Rye grass (*Lolium perenne*) studded with ergot.
B.—A bent of Barley grass (*Hordeum murinum*) ergotised.
C.—Awnless Darnel (*Lolium avense*) thickly set with ergot spurs.

—if when in full bloom, so much the better; by draining all wet land; by keeping hedges low and trees lopped to give a free current of air; and by setting children and women to hand-pick when the spurs are visible. Nothing is lost to the farmer by cutting his hay in good time, for the quality will be much better than if the plants are overgrown. Shortness of space here compels us to close our remarks on this interesting and important subject, but much more information will be found in the first book of our series—"The Cow and Calf." The accompanying illustrations represent some ergotised grass drawn by our own artist.

Dipping.

The lambs must be dipped at shearing time, or within a week or two afterwards, so that the work may be over before the hands are required for haymaking. Any ticks or lice upon the ewes after shearing will quickly find their way to the better shelter of the fleeces of the lambs, so it is essential that the lambs should then be dipped. It also pays to pass the ewes through, to prevent the "fly" striking.

Many farmers now do so, as the ewes take up but very little liquor whilst carrying no wool. But if this is done, it will be needful to dip the sheep five or six weeks later, when there will be such a bite of wool upon them as to retain sufficient dip to keep off the "fly." Some prefer to leave the dipping of both lambs and ewes until some three weeks after shearing, when the ewes are again carrying some little wool—sufficient to carry enough dip to prevent the attack of this pest.

Which of these times to prefer for dipping must depend upon the district or climate, care being taken that the animals shall be free from insects before hay harvest, and then protected from "fly" before the corn harvest begins; in fact, that the flock shall be in a well-protected condition before each harvest.

Ewes and hoggets should be dipped between September and mid-November to free them from insects and any trace of scab, and to ensure that the flocks are in good condition before they are sent to the hills, turnips, or elsewhere for their winter quarters. It is important that the dip used for this autumn dipping should be of a somewhat oily character, that it may slightly oil the fleeces to turn the wet in the inclement season of winter.

Dip all stock when brought home from winter quarters, excepting in-lamb ewes, to exterminate insects and any traces of scab that may be found upon them. If the winter has been severe, the more will insect-pests be found to abound. All home stock should also be dipped three or four weeks before shearing, for if a good, non-poisonous dip, free from sulphur, be employed, it will leave the fleece in a fine condition for that operation. The fleece will then handle and weigh well when shorn, having passed the last stages of growth on an animal in thriving condition.

Always dip any newly-purchased stock as soon as brought home. This should be a rule without exception, as strange sheep are very liable to carry scab or skin-disease with them; and this dipping will also tend to remove any trace of foot-rot that may have commenced if the sheep have journeyed far. Take care to use the swim-dipping machine, and keep each

sheep in the solution a full minute, so that the hoofs, as well as the other parts of the body, may be well soaked.

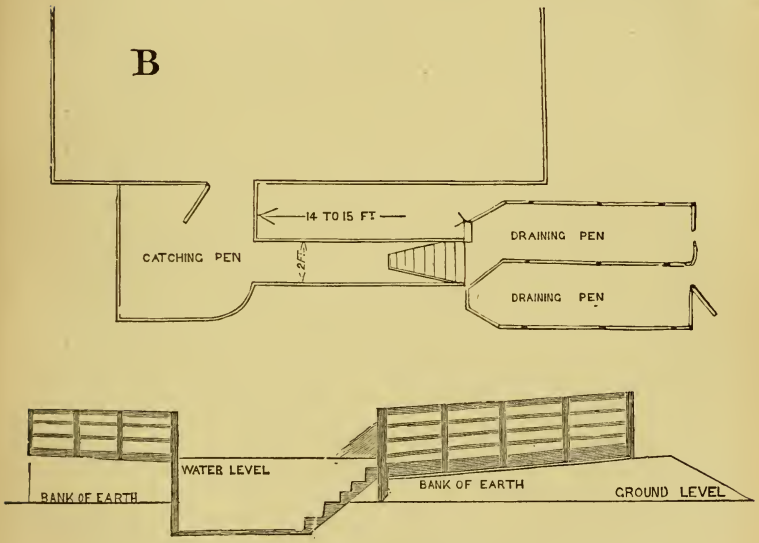
Rams are sometimes the means of imparting scab to a flock. They should always be carefully examined for this before being placed with the ewes.

Method of Dipping.—It is somewhat surprising that the old "tub" arrangement of dipping still continues in force on so many farms. It is all very well where numbers as small as 50 to 100 have to be dealt with, but it is altogether a mistake to retain such an antiquated and objectionable method when a greater number have to be operated upon. It may have occurred to many farmers how objectionable it is that sheep should have to be turned upon their backs and placed in the bath back downwards, to say nothing of the loss in time and labour, while with the swim-dipping machine the sheep can be immersed whilst in an upright position and with their feet downwards. This is a great advantage, the sheep struggle less, and the feet as well as the bodies get well soaked in the solution, which further acts as a preventive of foot-rot.

The length of time the animals should be left in the solution will depend upon circumstances. If ticks and lice have only to be dealt with, it will be sufficient to give them one plunge into the liquid, seeing that every part is thoroughly wetted. This will occupy say a quarter of a minute. The animals may then be passed to the draining-pen; but if any trace of scab is to be dealt with, or if the sheep are fed upon ground likely to produce foot-rot, or are in districts where either of these diseases are prevalent, then they should be left in the solution a longer time, at least a full minute—the object being that the solution may soak and soften

every scab spot on the body or ulcers within the hoofs. On no account should the dipping be hurried if these diseases exist.

One dipping may suffice for scab if the disease is only in its early stage, but if more advanced, twice dipping will be needful. The first dipping will destroy all the scab-mites and eggs it reaches; the second



A WELL-ARRANGED BATH.

dipping is needful to exterminate those that may have been buried far under the scurf-skin or the scabs. As the eggs are hatched in from ten to twenty days, according to the temperature and weather, and the young scab-mites then come to the surface of the skin, that length of time should elapse between the first and second dippings.

Any farmer undecided whether to use a poisonous or a non-poisonous dip will not need much urging to use a safe preparation, provided it is equally efficacious. Nothing can beat one of the two or three leading non-poisonous dips now being used, such as M'Dougall's, either for efficiency or safety. They do their work thoroughly and well. Perhaps an exception may be taken to one point, as the experience of farmers seems to differ upon it, viz., whilst they all agree that a good non-poisonous dip is everything one can wish, so far as ticks, lice, scab, &c., are concerned, some say they have not found them good preventives against the attack of "fly;" and many recommend for this special purpose that to the non-poisonous bath be added half the ordinary quantity of an arsenical dip. The explanation of this somewhat strange mixture—of the dote and antidote—being the theory that since the maggot fly itself does not feed upon the sheep, but simply deposits its ova on suitable spots over the backs and rumps, there is no substance known that will prevent these attacks, so another means of safeguarding the animals from injury must be found. The damage is done by the ova, and not the fly itself, and these ova seem to be deposited in the form of minute maggots; anyhow, the flyblow, two or three hours after being deposited, may, with the naked eye, be seen to consist of minute maggots working their way to the skin, upon reaching which they begin to feed upon it voraciously. So the thing wanted is to destroy these maggots in their early stage. If a non-poisonous dip has been used, and the fleece has got quite dry again, we can fancy some of these might escape, unless rain came just at the time needed, to wet the fleece sufficiently to produce sufficient solution,

from the dip remaining upon the fleece, to coagulate or solidify the ova. Here comes in the reason for having added some arsenical dip, viz., that when the maggots begin to feed, there should be sufficient arsenic upon the flesh to poison them. Some farmers tell us that in districts where red lice are prevalent a similar mixture of the two widely different dips is better than either of them alone for these two special purposes. It may be so, and we shall watch with interest further experiments in this line which we ourselves contemplate carrying out.

A word of caution may be useful. Since the farmers became aware of the heavy loss entailed upon them from the grub of the ox botfly,[1] they may, in their anxiety to rid themselves of this pest, use the same dressing as they used for the flocks. If this dressing should happen to be a poisonous one, the results would be disastrous, for the following simple reasons:—

First.—Because cattle absorb poison much more readily than sheep.

Second.—Because they lick themselves, and so are liable to take the poison into their mouths.

It cannot be pointed out too strongly that all poisonous mixtures are extremely dangerous; therefore they should seldom be used; while to apply them on cattle is simply madness.

It is well to point out to farmers who are accustomed to use poisonous dressings for their flocks that it is hardly safe to dip the ewes till the lambs are a few weeks older than the time mentioned in the beginning of the chapter, so that they may be better able to with-

[1] See pamphlet, "The Botfly of the Ox" (*Œstius Bovis*). Price 6d. T. C. Jack, Grange Publishing Works, Edinburgh.

stand the poisonous action of any arsenic that may drain upon the udders of the ewes. It is also worth noting that wherever lambs are concerned poisonous mixtures should be avoided; also where sheep are dipped soon after shearing a poisonous mixture is apt to be absorbed, to the detriment of the sheep, through the broken surfaces of shear-wounds, and may be conveyed to the lambs through their mother's milk.

Diseases.

We desire to make this subject a main feature of our book, seeing that the matter appears to have been much overlooked by other writers.

It is seldom deemed worth while to call in the qualified veterinary surgeon to attend a sheep that is ill, and the shepherd has only one or two questionable methods of treating all cases, not dreaming that the sheep is subject to more than just a few ailments, while the farmer himself is in too many instances little better informed. Sheep are victims to more diseases than either masters or shepherds in their ignorance suspect, and it is quite time they were convinced of such a fact, and made aware of the nature of the various maladies, seeing that so many of them are amenable to proper treatment. It is not so much diseases that attack the whole flock, such as scab, foot-and-mouth disease, liver rot, &c., that are neglected, as the more everyday ailments which seize only single animals, such as inflammation, gid, foot-rot, &c. Of the commoner disorders minute particulars shall be given, for the right treatment of these is a sadly neglected

part of the farmer's education. In bringing forward the subject, we are desirous of arousing the attention of brother agriculturists to the fact that the ailments of their sheep demand as much attention as those of their larger farm animals. Howbeit, strangely enough, farmers have with regard to the diseases of sheep assumed in the past very much the position of *fatalists* —the death of the animal has been looked upon with only a limited amount of interest, and, indeed, with some degree of callousness, as it was thought that nothing could be done for such sufferers. Thus it is quite time that ovine diseases should meet with more attention from the veterinary surgeon, the veterinary chemist, and the flockmaster and his servants.

While we discard the empiric, there are well-known veterinary chemists of the present day who provide the stock-keeper with most valuable chests of medicine, with which he may treat all the commoner diseases, and check the more serious ones, pending the calling in of the veterinary surgeon. By studious care we have proved over and over again that nine out of ten complaints are easily combated by the stock-keeper if he will but take pains to distinguish one ailment from another, and treat them with care and patience. One advantage the farmer ever has is, that he may always treat maladies at once in their early stages with hope of success, whereas the veterinary surgeon is often unable to be summoned to the spot until too late for the most skilful treatment to be of any use. Indeed, attention to the maladies of the sheep may be considered essentially the work of the stock-owner and his shepherd, and with a proper supply of medicine at hand nearly every emergency can be met.

Husk or Hoose.

This parasitic disease of the breathing organs of the lungs is properly called verminous bronchitis, from the presence in the windpipe and air-passages of the lungs of numerous minute creatures called *Strongyli filariæ*. When the attacks are not understood by the farmer, great mortality takes place, and we regret to say that the stock-owner is frequently, in the case of husk, quite ignorant of the ailment from which his flocks are suffering. If a similar malady broke out among calves, immediate steps would probably be taken to effect a cure; but in lambs the complaint is often assigned to some peculiar and unwholesome quality in the grass. We need scarcely add that such is only an imaginary cause, for the disease is caused, as above observed, by living creatures abounding in the breathing organs, which, if not quickly expelled, will make much mortality among the young animals.

The worm (*Strongylus filaria*) is a thread-like creature of from three-quarters of an inch to two inches long, the female being much longer than the male. The worm is of a whitish colour, and about as thick as fine thread. It locates itself in the air-passages of the lamb, goat, dromedary, camel, and deer. The following is an illustration of the *Strongylus filaria*, male, enlarged.

Its Life History.—The worm in its mature condition inhabits the air-passages within the lungs; but it is generally thought that it may be reproduced in or out of the body. In the first mode, the female worm creeps into an air-cell of the lungs, and there encysts

herself, and producing eggs, or embryo worms, already hatched; or she dies, and countless eggs hatching out amid the *debris*, the young finally migrate into the adjacent air-passages, grow to maturity, and reproduce their kind. In the second mode, the impregnated female worm is expelled by coughing, and perishes in water, in moist earth, or on vegetables, and the eggs escaping from the decomposing remains, may be unhatched for months, or even years, or in genial weather, with the advantage of a humid atmosphere, may rapidly open and allow the escape of the almost microscopic embryo parasites. These in their turn are also exceedingly tenacious of life, and may exist for an in-

Strongylus filaria, male enlarged (*Thudicum*). When adult, should be at least five times the length for this thickness.

definite period in water, moist soil, or on vegetables but only begin to grow to their mature condition when they are taken in by a suitable host with food or liquid. In the sheep or lamb, when the *Strongyli filariæ* are once introduced, they maintain their place in the lungs for the remainder of the lifetime of the host (unless expelled by the act of coughing), although more young ones may or may not be taken in. Still the creatures that give rise to husk in such animals as the ox are generally dislodged. Older sheep nurse the worms, although, like cattle of a certain age, they do not often suffer from the presence of the parasite. Corroborative of this, Messrs. Gresswells, South Lin-

colnshire, than whom there are no better authorities to follow, observe:—"If one examine the lungs of older sheep which have harboured the worms, one will find large numbers of little rounded masses, some hollow, containing semi-fluid matter, while others again are very hard and calcareous. Now the different characters of these little nodules, which vary in size from that of a mustard seed to that of a lentil seed, represent different stages in their growth, each nodule containing worms lying coiled up within. It is necessary to state that one often finds these little masses in the lungs of healthy sheep, and it will be thus seen they do not necessarily cause much mischief. Nevertheless, when thus situated, they do sometimes cause great weakness and death in sheep. If the carcase of a lamb dead of verminous bronchitis be examined, the windpipe and bronchial tubes will be found more or less choked up with worms. How do the worms find their way into the lungs of sheep? How do they gain access into the bronchial tubes of lambs, and thereby cause verminous bronchitis, or parasitic disease of the breathing organs? These questions are unfortunately still *sub judice*."

Before considering the above queries, we have to relate a marvellous and important discovery which was recently made by the late T. Spencer Cobbold, M.D., F.R.S., with regard to the life history of lung worms, and although his experiments were with the parasite of the calf (*Strongylus micrurus*), yet, as far as its life changes go, there is little difference between the lung-worm of the latter animal and that of the sheep.

On October 22, 1875, numerous embryos, such as

are taken from the windpipe of a dead calf, were placed in some finely sifted earth in the hollow of a watch-glass. The mould was rich and well moistened with water. At the same time two other vessels were charged with coarse earth, into which the germs and embryos of a separate parasite were indiscriminately cast. These embryos had an average length of $\frac{1}{90}$ of an inch, and they were only a trifle below $\frac{1}{1000}$ of an inch in thickness. On the following day (or twenty hours after) living embryos were found in the finely sifted soil, but in the coarse earth nearly all had perished. This fatality was probably due to the circumstance that shreds of the maternal organs of the parent worm had been introduced with the embryos, and had caused the organic contents of the two larger vessels to decompose. However, some of the embryos within their envelopes were still alive.

In another experiment, tried about the same time, it was proved how essential moisture is to the well-doing of these creatures, more particularly when in an immature state. A high temperature gives activity, but on the other hand severe frost will not destroy life. Thousands of embryos yet invested by their chorions were placed in water which was allowed to evaporate before the fire. The increased warmth, accompanied with moisture, caused great activity and hatching out of the embryos; but when the water had entirely evaporated, and the worms had become dried up, all attempts to restore their vitality failed.

From October until the following spring, occasional examinations were made of the finely sifted earth in the watch-glass, and in the coarse earth of the other vessels. In each case only very gradual change was

found to be taking place, such as a slight increase of length. This is a strong proof that the embryos can only advance to maturity in the breathing organs of some host, such as the lamb or calf. We must not, however, omit to state here that the embryos experimented on above were kept alive all the winter in closed earthen vessels, the soil being kept moist; but the vessels were placed near the window, where the temperature was often below freezing point. Thus the farmer can have no hopes of the severity of a more than usually hard winter cleansing his pastures of this dreaded pest.

We have now to refer to a newly discovered host that plays the part of nurse to the strongyle while in its embryo state, and that new host is the common earth-worm. It appears clear that until the embryo has passed a certain period in the body of the said earth-worm, or some other such creature, it does not reach a state to advance in growth. Dr. Cobbold gave the following details in the *Royal Agricultural Society's Journal*, 1886:—

"*Earth-worms ingesting Embryos.*—When on the 25th of October 1875 I was making a microscopic examination of the surface of the sifted soil that had been placed in a watch-glass (and subsequently deposited under a bell-jar, enclosing ferns), it happened that a sudden upheaval of the soil declared the presence of an intruder. This was a small earth-worm barely an inch in length. Its introduction was accidental, but we may suppose that it had wandered from the dry soil of the fern-pan seeking a moister, and therefore more congenial soil. Be that as it may, I determined to ascertain if the earth-worm had swal-

lowed any of my experimental embryos. Accordingly, after washing the worm under a water-tap, I snipped off the lower end of its body. The contents of the divided intestine of the worm were then allowed to escape on to a glass slide, for examination with the microscope. This done, I had the satisfaction of finding strongyle ova and embryos in the earth-worm's fœces. Some of the freed embryos were larger than others. Not unnaturally, this interesting find suggested a possibility that, in the ordinary course of nature, earth-worms might be called upon to play the *rôle* of intermediary hosts to the strongyles of the calf, and perhaps also to the lung-worms of the sheep. On this hypothesis (which had not been previously framed by helminthologists), I resolved to continue the investigation; and, as a first step in the process, the unequal halves of the divided worm were replaced in the soil —this time in ordinary earth that had not been sifted through fine muslin. The more advanced embryos taken from the earth-worm had slightly increased in length. Their heads displayed a mouth leading to a short, straight, œsophageal tube, lined with chitin; all of them presenting more pointed tails than formerly, with their ends, in many instances, bent forward like the barb of a fish-hook. The internal granules were more crowded, rendering the position of the future intestine more conspicuous, though as yet the differentiation gave no sign of any distinct intestinal wall. The thickness of the body had not correspondingly increased."

Dr. Cobbold next examined from time to time fresh earth-worms in order to corroborate the above discoveries. Some of the newly examined worms were

infected with the embryo of the lung-worm, and some were not. Further interesting experiments were made, but space will not admit of all being given here. The following, however, is more especially important.

"Seeing that no more structural changes were likely to be observed in the earth-worm larvæ, it occurred to me to select a few of them and to place them on the moist fronds of ferns under a bell-jar. The pinnules of the ferns (*Asplenium bulbiferum*) being well covered with condensed vapour, I was able to place the young worms in dewdrops precisely similar to those that occur on the blades of grass in low-lying pastures. Accordingly, on the 27th of October, I deposited three or four specimens on the extremity of a marked frond. On the following day, after the lapse of only twenty-two hours, I carefully detached a few of the terminal pinnules of the frond, and placing these under the one-inch Ross objective glass, I had the satisfaction of detecting one of the larvæ in the act of cruising about very actively. The addition of a drop of water increased its activity, and it became extremely difficult to follow the creature's eel-like movements. In size it had so much increased that it was now actually visible to the naked eye, measuring as much as $\frac{1}{30}$ of an inch from head to tail."

This last experiment shows that when once the creatures escape from the body of the earth-worm, and providing surroundings are favourable, they grow with amazing rapidity. "One by one," observes Dr. Cobbold, "the few larvæ that I had reared on the fern-fronds were either dying or disappearing, so that by the 1st of November I had only a solitary larva left. This worm continued to grow rapidly, but its internal organs were

not materially advanced in complexity. Wishing to obtain further results, I sought to place the larva under new conditions. Of course, to transfer it to the windpipe of a living calf would have given the larva a good chance of rapidly acquiring sexual maturity; but I was deterred from this step by the consideration of the almost utter hopelessness of getting a positive result from this solitary transfer, and also by the hope, which I then entertained, of renewing my experiments on a much more extended scale. Under the circumstances, it occurred to me to imitate in some degree the conditions which are obtained in nature, without resorting to the crucial experiment. Accordingly, I placed the larva in the hollow of an excavated glass slide, immersing the worm in human saliva, and raising the temperature to about 70° Fahr. At once, and this is a point of some significance, the little worm displayed extremely lively movements, such, indeed, as can only be fitly described as frantic. I have no hesitation in saying that the young worm showed powers of motion such as would have enabled it (had it been in the windpipe of an animal) to pass rapidly down the air-passages. So far satisfied, I removed the slide from before the fire, and replaced it under the bell-jar of the fern-pan. On the following day I found it still alive; but, in consequence of the lowered temperature, its movements were much restricted. No fresh structural advances were observed. Again, on the succeeding day, without altering the environment, I renewed my inspection of the slide, and found that the saliva had become thicker and of ropy consistence. However, the worm was alive, and, though at first lying almost motionless, it soon became tolerably vigorous when

disturbed. Placing a thin glass cover over it, and waiting my opportunity, I at length succeeded in obtaining an excellent view of its form and structure. My observations were now at an end. An effort to transfer the saliva and the worm to a glass tube (which I afterwards carried for a short time beneath the armpit) terminated unsuccessfully."

The general conclusions drawn from the above important information is that the husk or hoose worm of either calf or lamb requires such a host as the earth-worm before it becomes changed into an active larval state. When the embryos pass from the earth-worm (providing rain or a humid atmosphere prevails) they increase in size so as to become visible to the naked eye. They then enter upon their second parasitic stage of existence in the air-passage of the lungs of either calf or lamb, and there develop rapidly. In these air-passages the females become pregnant, and are most prolific. Mr. Beulah, a microscopist and practical agriculturist, estimates that the lung-worm of the sheep carries as many as 300,000 eggs or embryos. As long as the parent worm continues to live she produces fresh germs and embryos to supply the place of those that by coughing or otherwise are expelled from the host. Therefore, all things being favourable, it is quite reasonable to estimate that one female husk or hoose worm is capable of discharging several millions of embryos. When it is considered how numerous are the full-grown worms that are to be found in the wind-pipe and lungs of any animal suffering from verminous bronchitis, the number of eggs and young that are produced defy all calculation. Thus it is fortunate indeed that only occasionally do the eggs find favourable con-

ditions that enable them to pass to the embryo state, from that to the larva, and the latter to find its way to its final parasitic home, viz., the lungs of a calf or lamb.

How does the minute immature larva or embryo find its way into the air-passages of the animals it infests? We have often microscopically examined these parasites, and any one who has observed their great activity, particularly when placed in water, will at once conceive how easily they might pass up the nostrils of their future hosts. Both warmth and moisture are found there, and the minute, slimy, eel-like creatures, having all things favourable, pass with ease into places inaccessible to less active, dryer-skinned parasites. It is still doubtful whether the creature enters by the nostril or with the food (probably in both ways), but this signifies little, for by either course the desired goal would be reached. If only one worm in a million effected its purpose, it would be ample to seriously affect the host. Here the life history of the strongyle concludes.

Symptoms.—These are essentially those of bronchitis, with the difference that with husk or hoose nearly the whole flock is affected. The inflammation and irritation wrought by the worm causes at first a rather slight, dry, husky cough, but later on this becomes incessant. Then follows laboured breathing, and a dejected appearance. A frothy mucus, containing worms and eggs, is thrown from the mouth, and the animal loses strength and flesh rapidly. A depraved appetite, leading the animal to eat earth, and excessive thirst, usually prevail. In advanced stages of the malady the cough is very troublesome, and death often

ensues from suffocation. If a *post-mortem* examination be made, worms will be found in the windpipe, and the air-passages of the lungs will appear completely blocked with the pests. In some instances worms are found in the intestinal organs—then much straining and frequent passages of excrement mixed with blood are observed. When both the lungs and the intestines are affected, the sufferer quickly succumbs, unless active measures are taken for relief.

Treatment.—First, move the animals from the ground where they have picked up the worms. Secondly, the worms must be destroyed without delay. Thirdly, the animals' strength must be upheld while the vermincide is acting. If any of the lambs have advanced to a state of great prostration there will be no hope of cure, and attention had better be turned to those still able to withstand treatment. A writer in the *Field* for November 6, 1886, observes: "Of the various means for destroying the lung-worms, the plan of injecting the remedies into the windpipe, as advocated by Dr. Levi of the University of Pisa, is undoubtedly the most successful. This method is gaining ground among the members of the veterinary profession, and those who have tried it speak strongly in its favour. A large hypodermic syringe, with a strong and sharp needle-point, may be used. The pointed pipe is thrust into the windpipe about the middle of the neck, and the fluid is slowly injected. In this way the medicines which, when given by the mouth, seemed to be useful as worm destroyers, became far more efficacious, as they were brought at once into contact with the parasites in the air-tubes. Turpentine, carbolic acid, chloroform, and other agents, are readily administered

by the windpipe, and no risk of injuring the animal is incurred."

A very good mixture for injection into the windpipe is made by adding twenty drops of carbolic acid to one drachm of turpentine, half a drachm of chloroform, and two drachms of olive oil. This quantity may be injected at one time into the windpipe of a calf; one-half to one-fourth of the dose will suffice for a lamb. It is recommended to repeat the injection daily for three days in ordinary cases; but there is no objection to the continuance of the treatment for a longer period if it is necessary.

Internal remedies are of the same nature as those which are used for injection into the windpipe. Turpentine has always been a favourite drug, and the ordinary method of giving it is that of mixing a dose—about two drachms for a calf, and one drachm for a sheep—with an egg beaten up in a little milk. The turpentine thus given is of course absorbed, and some of it is exhaled afterwards from the mucous membrane of the bronchial tubes, and acts upon the parasites; but it is obvious that the action cannot be so direct as it is when the agent is injected into the tubes in which the worms are contained. Giving the medicine through the nostrils is a dangerous practice which the modern veterinarian discontinues, and there is no doubt that a certain risk of suffocation is incurred when pungent drugs are administered in this way. When the draught which is given by the nostrils finds its way, as it usually does, into the swallow and on to the stomach, there is no practical difference between this method and giving medicine by the mouth. In some cases, however, a portion of the fluid gets into the

larynx, and thence down the windpipe into the lungs. In such case there is always a good deal of irritation caused, as shown by convulsive breathing and coughing. The desired end is therefore much more easily attained by injecting the remedy at once into the windpipe, at a point below the larynx, and thus avoiding the distress which contact of an irritating agent with the opening of the glottis always causes.[1]

Inhalation of the vapour of tar, carbolic acid, or chlorine, is sometimes beneficial, but some risk attends this method of treatment, and at the best the results are not so satisfactory as those which are gained by passing the remedy directly into the windpipe by means of an appropriate syringe. The inhaling method of killing the worms is to place the animals in a close building, and to burn pinch after pinch of flowers of sulphur on a piece of paper placed on an iron shovel, until the air is charged with the fumes as much as the animals can bear without coughing violently. The application must be kept up for half an hour at a time, and the administrator should stay with the animals in the building to prevent accidents. The process should be repeated for several days in succession, and at intervals of a week for several weeks, so as to kill the successive broods of young worms. Not until all cough and abnormal breathing have passed off should the animals be considered as safe to mix with others or to go on to a healthy pasture.

To support the System of Animals under Treatment.—Feed liberally on such nutritious diet as cotton-cake,

[1] The "Broncholine," sold by Day, Son, & Hewitt, is also a reliable remedy, and a pamphlet is circulated by T. G. Hewitt, M.R.C.V.S.L., of the above firm, giving full directions for treatment of the lambs.

oats, peas, roots (swedes for choice), and give a tonic medicine consisting of the following:—Equal parts of sulphate of iron, ginger, and gentian; two ounces to be given daily to every ten lambs four months old. It can either be given in the food, or in gruel by drenching. Should the intestinal parasite be present, give every second day a teaspoonful each of salt and oil of turpentine in a quarter of a pint of milk. When administering medicines to lambs, great care should be taken not to hold the head on one side, or choking may be the result. When the head is held in a horizontal position this danger is avoided.

Prevention.—The farmer would do wisely to study this part of our subject with unremitting attention; indeed we have given the life history of the worm in detail in order to assist the sheep-farmer in preventing such a disastrous malady breaking out among his flocks. To overstock land with sheep is at all times a reprehensible plan, as being conducive to numerous other diseases as well as husk or hoose. Wet land should be well drained, seeing that the worms love moisture in all stages of their existence. Damp ground is often so infested with the eggs, embryos, or mature worms, that only a repeated dressing of quicklime or common salt will rid the pasture of them. When fields are known to abound in these pests, the herbage should be mown for several years, and when the winter keep is taken off, they should be grazed by such animals as the horse, or horned cattle, they not being subject to the attacks of *Strongylus filaria*. If arable land were not so unprofitable, we would advise that the infected fields should be ploughed. Rock salt should be at hand when animals are grazing on suspected pasture, for

whenever this mineral comes in contact with the parasites it destroys them immediately. It must be borne in mind that water and wet forage crops frequently convey the worms to sheep or lambs. It is possible to graze pastures where the worms abound without animals being affected; but the grass must only be eaten when unmoistened by dew or rain. When the herbage is damp the creatures creep up it; but if the plants are dry, the parasites quickly return to the earth. It is folly to graze lambs on a second crop of herbage when the first has been eaten off with sheep, for the latter will most likely have left eggs or embryos behind. If it were possible to destroy the common earth-worm, one important intermediate host in the life of the pest would be removed. The number of the earth-worms is, however, legion, and even if they were less numerous, we doubt if the British farmer could spare them. Again, no one at present knows but that some other creature also plays the part of intermediate host to the parasites.

Fatal Results.—The British grazier suffers a heavy annual loss from the husk or hoose. There are some lands on which the farmer dare not attempt to graze lambs in winter, believing that the herbage contains some deadly weeds. The real evil is the verminous parasites on the plants. A sheep-raiser from Buenos Ayres wrote a few months ago in the *Field* to the following effect. He asked for a remedy against the attacks of *Strongylus filaria*, which, he stated, had caused the loss of a million of sheep the preceding year in his country. He went on to observe—"It (the malady) was not known in the country until a short time ago, and various causes are suggested, but

to my mind there can be no doubt that it comes from overstocking with sheep, just as the grouse disease comes in Scotland from a like cause. Worms are also found in the intestines of the sheep, but they seem different from the lung-worm; or are they the same, but looking different from their habitat? In the intestines something may be done towards a cure, though the doctoring of 60,000 or 100,000 sheep is a big affair; but when the lung is attacked in every part by myriads and myriads of worms, what can be done? I have heard that sixty years ago the lung-worm destroyed thousands of sheep in England." So it appears that Great Britain is not the only portion of the globe where verminous bronchitis rages to such an extent as almost to become a national calamity, and it behoves all stock-raisers to move hand in hand in order to exterminate the creatures that give rise to this deadly malady.

Liver-Rot—Fluke Disease.

This affection is most destructive to sheep, as hard upon two million head have perished by it in England alone in certain years. For several seasons, about the year 1880, this disease raged with such fury throughout grazing farms as to nearly clear every flock from the field. Hundreds of farmers were ruined in consequence, and, other branches of their occupation being at the same time unremunerative, they were unable to "recoup" themselves. Hares and rabbits died wholesale at the same time, and by their deaths the farmer was warned of the dreadful disease about

to attack his flocks. The disease had not visited England for nearly four decades before the attack in 1880, except a few cases in which sheep were grazed on low-lying flooded meadows, where the parasitic pest is always present.

Cause.—This is immediately determined by the pre-

Fasciola Hepatica.

Distomum Lanceolatum.

sence in the gall-ducts of two flat, leaf-like parasites, the *Fasciola hepatica* and the *Distomum lanceolatum*—the first $\frac{3}{4}$ to 1 inch in length, the second 4 lines. These inhabit the gall-ducts of all domestic and many wild animals, and even of man, but in most of these they do little harm. The eggs of these parasites, laid in the gall-ducts, cannot be developed there, but pass

out with the bile and dung, hatching in pools of fresh water, in which the embryo floats until it finds a mollusc in which it can encyst itself and become a brood capsule, developing many new embryos within it. These embryos may form new brood capsules, and thus increase their numbers materially; or if swallowed by a mammal along with its food or water, they develop into flukes, inhabiting the bile-ducts, and reproducing themselves only by eggs. The necessity for these intermediate generations, and the fact that they can only take place in fresh water, and in fresh-water molluscs, points to thorough drainage as the most efficient means of limiting the ravages of the parasites. In small numbers they do little harm, and as they cannot multiply within the body, their presence may be of no consequence; but when present in large numbers they become most destructive, taking off the whole flock. On certain damp lands where these parasites abound sheep cannot withstand the attacks, no matter how well fed, and young cattle often likewise perish. A single infected sheep brought on to such lands will speedily stock them with the dreaded creatures, as infested German rams did the Colony of Victoria in 1855.

Symptoms.—Sheep at the commencement of an attack may thrive unusually for a month or two, but soon they begin to lose flesh and waste with a rapidity that is surprising. The skin and the membranes of the nose and eyes become soft and puffy; the naturally bright pink vessels of the eyes become yellowish, dark, or even quite imperceptible; the eye mostly assumes a yellowish-white tinge, no blood-vessels being seen beneath the eyelid; and the skin is pale, bloodless, deficient

in yolk or oil, dry, and scurfy. The wool loses its brilliancy and comes out easily when pulled; the muscles waste, the animal is "razor-backed," the hip-bones project, and the flank becomes sunken, the belly pendent, and the back drooped from dropsical effusion. Similar effusions take place in the chest beneath the abdomen and breast-bone, and under the lower jaw an enlargement the size of an egg is seen. The head is no longer carried erect, the expression of the face is haggard and hopeless, the appetite capricious, thirst ardent, and there is occasional diarrhœa. Examination of the dung reveals myriads of microscopic eggs $\frac{1}{180}$ in diameter. In making such an examination the flock-owner might many times save himself much loss by having the animals slaughtered, for in an early stage of the disease the sheep is in good condition, and the flesh wholesome.

Treatment.—Almost all the tonics of the pharmacopœia have been employed with more or less effect, but all usually fail when many parasites have gained access to the system. The following is a good tonic mixture:—

Linseed, rape, pea, oat, barley, or unbolted wheat-flour	40 lbs.
Powdered gentian or anise seed . . .	4 „
Common salt	4 „
Sulphate or oxide of iron	1 „

Give half a pint daily to each sheep.

Whatever the treatment, it is essential that the flock be removed from the infested meadow to a perfectly dry pasture or salt marsh, on either of which the eggs of the

fluke will perish. To turn on to a fresh wet pasture is merely to stock that also with the parasites.

Prevention.—Keep sheep on high dry pastures or salt marshes, where the fluke cannot live out of the body. Feed salt daily if flukes exist, to however limited an extent; this is fatal to the young flukes, and will destroy most of them as they are taken in. A knob of rock salt should be within reach of the sheep-flock both in health and disease. Thorough drainage of infested pastures will make them wholesome. This may fail when land is subject to inundations; and in this case such land should be devoted to raising hay or other crops. Keeping the sheep off the infested fields at night, and until the dews leave the grass in the morning, will go a long way towards protecting them. In instances of the introduction of this parasite into a new country, the contaminated sheep should be destroyed, and the infested pasture, with a wide area around it, proscribed from being grazed. Frequent dressings of salt on the pasture is destructive to the pest and productive of fine grasses, to the crowding out of coarser herbage.

Abortion.

In various localities in untoward seasons this complaint is the bane of the cattle-breeder and sheep-farmer. Doubtless more cases occur in ewes than the shepherd knows of, inasmuch as he does not come into so close a contact with his sheep-flock as the cattle-breeder does with his cow-herds. There is no treatment practical with the ewe that is about to abort,

even where prior symptoms are noticed; our attention must therefore be given to prevention, and this is best attained by removing such causes as may lead to the mishap. These are more numerous than the farmer is aware of, and may be chiefly found among the following—unwholesome food, unwholesome water, fright, over-exertion, or exposure.

Unwholesome Food.—Many veterinary surgeons of the present day believe cases of abortion to arise from the flock eating ergotted grasses. This, doubtless, may be so in isolated instances, but it is not nearly so common a cause in the ewe as in the cow. The fact is, ergot is only found in the grasses between the beginning of August and December, and during this time the majority of ewes have only been a short time impregnated. We find that ergot has much more power to cause abortion when the fœtus is getting more fully grown. The action of ergot is to cause unnatural and continuous pains in the walls of the uterus, contracting that part, and inducing the animal to cast off its young, as in case of natural parturition. Howbeit, when the fœtus is small, the walls of the uterus do not press so closely upon it, and the mother does not therefore have the desire to get rid of it. Ergot is commonly given to women and all kinds of animals to hasten labour, where the professional attendant deems it prudent to quicken the pains, but this drug must not be used by any unqualified person, or the most serious results might follow. Some such flocks as breed house lambs at the latter end of the year might be affected, but the chances are much against it, as ergot is found only in matured bents of grass; sheep, consequently, mostly escape it, as they in a great measure feed upon

A Group of Cotswolds.

Shearling Ewes—1. First Prize; 2. Second Prize; 3. Third Prize. Rams—1. First Prize; 2. Second Prize; 3. Third Prize. R.A.S.S. Birmingham. Property of Mr. Russell Swanwick, R.A.C. Farm, Cirencester.

young grass blades, rejecting the older plants. While, therefore, we allow that ergot is one of the most common causes of abortion in cows, wholesale cases of miscarriage in ewes cannot be often attributed thereto.

Amongst unwholesome food is fog, or coarse grass, with no admixture of young grass, heated corn, mouldy or over-ripened hay, frosted roots, or too many mangel early in the season, before they are matured in the clamps. Any food that is abnormally hard to digest is also very liable to cause untimely birth, and an excess of roots without some dry food should always be avoided.

Unwholesome Water.—Ewes do not suffer so much as cows from drinking unwholesome water, for sheep need but little moisture in excess of that provided in their succulent food. But in long frosts, when the ground is not covered with snow—so frequently occurring when the ewes are in an advanced stage of pregnancy —they are obliged to subsist on dry food. Then they drink freely; and too often their only font is a foul pond, with a small hole broken in the ice for their use. Not only is such water rendered unwholesome by the excrement of numerous animals during the year, but the careless shepherd not uncommonly makes the same pond a receptacle for animals that die on the farm, more particularly aborted ones. Such water is quite likely to cause abortion directly, or to create some other disarrangement of the system soon leading to it.

Fright is a fully accepted cause of miscarriage in every animal, and the sheep being exceedingly timid, its nervous system is more easily upset. Careless

shepherds use the dog much too freely; indeed, unless on the spacious Downs of England, or on the hills in Scotland, there is no occasion for using it amongst the pregnant flock. All breeding animals need to be kept very quiet; upon the face of it, then, what injury must not the unruly sheep-dog do who ofttimes races the poor ewe till she can scarcely stand? Foxhounds, too, often do much damage, while a pack of harriers is much worse, as where they hunt they keep the whole stock on a farm in a state of excitement the whole day. When such trespassers are expected, it is prudent to remove the sheep to some secluded yard. They are sometimes put in the nearest pen, where, as likely as not, a large portion of the hounds or horsemen will pass through, and thus the evil sought to be avoided is aggravated.

Over-exertion.—Free exercise is good for all breeding animals, but journeys of too great a length, or fast travelling, have always to be avoided. If ewes in lamb have to change hands, it is far better for the buyer that he should purchase them at home than trade in the market. In the latter place, the flock is almost sure to meet with some abuse or over-exertion. Casting the ewes to examine their bags, or condition, should be forbidden; yet in the market too much of this mischief is practised, and cases of abortion later on are almost certain to result. In driving ewes when their time is nearly accomplished, the slightest signs of weakness should be at once the signal to cease trying the animals' strength further.

Exposure.—If the flock in winter time is depastured in a very exposed situation in the field, or on a hill

where severe frosts, snow, and tempestuous winds prevail, miscarriage may be expected. Folding them on roots is also to be condemned—first, from the animals being much exposed; secondly, because too many roots are forbidden food before lambing; and thirdly, because the animals so confined are debarred from obtaining normal exercise.

In conclusion, the wise flock-keeper will endeavour to guard against the stated causes; should cases occur, however, he will at once remove the ewes from the remainder of the flock to prevent infection. Further, he will keep a doubly cautious look-out about midtime of the pregnancy, this being the period when the ewes are more liable to cast their lambs, although the evil may have been done at any previous period of gestation.

Scab.[1]

Most farmers are but too well acquainted with this destructive and loathsome disease, and know that only prompt and determined treatment will effect a cure. It is most infectious; for should a healthy sheep touch posts, rails, or gates against which a suffering animal has rubbed, it will become similarly affected.

Symptoms.—Intense itching (caused by small creatures under the skin), continuous rubbing against gates or rails, and a dirty mark down the shoulder caused by the scratching of the hind foot. The disease invariably displays itself first down the shoulder, and if this part

[1] It is analogous to mange in the horse and dog, and itch in the human being.

is rubbed with the hand, the animal appears grateful for the friction. Tufts of wool are torn off by the sheep, giving the fleece a ragged appearance, and if the skin is examined, whitish scabs will be observed; it will also be thickened and rendered rigid by exudation. There are also eruptions, and in these excoriations; while later on deep sores, or ulcers, caused by incessant desperate rubbing show themselves. The culminating proof, however, is the discovery of the acari, the minute creatures which cause the disease. These can generally be discerned by placing a little of the scurf on a plate of glass, when, if closely observed, these scurf scabs will be seen to move. The warmer the temperature the more rapid the movement. A shilling pocket lens will prove of great assistance, and, as the farmer will frequently find it of use for other purposes, we strongly advise him to be provided with one.

Treatment.—No half measures must be trusted, but the treatment is entirely external, with the exception, of course, that the sheep should be kept on generous diet. Baths are considered by high authorities a *sine qua non* to the cure of the disease, and the whole flock that have been in company with the infected animals must be dressed. The following will be found to make a good wash, which will neither stain the wool nor materially endanger the sheep:—Tobacco, 16 lbs.; oil of tar, 3 pints; soda ash, 20 lbs.; soft soap, 4 lbs. Boil the tobacco and dissolve the other ingredients in a few gallons of boiling water; then add water to make up to 50 gallons, retaining a temperature of about 70° Fahr. This will suffice for fifty sheep. Each sheep

is to be kept in the bath for three minutes, two men meanwhile breaking up the scabs and working the liquid into all parts of the skin. When taken out the animal should be laid on a sloping drainer, the liquid being squeezed out of the wool and allowed to flow back into the bath. A second and even a third bath may be necessary in inveterate cases. For newly shorn sheep oily applications are better, being less liable to be washed off by rains. One part of oil of tar to forty parts castor oil or lard will usually suffice, but sulphur may be added if desired. The common use of mineral poisons, and especially the compounds of mercury, for sheep dips, must be strongly deprecated; but M'Dougall Brothers, Coopers, Biggs, and several other of the best firms, sell dips that may be used with safety, and will be found effectual.

Hoven or Blown.

When the spring grass shows extra luxuriance, and frosts occasionally prevail late into the spring, hoven occurs, both in the sheep-flock and cow-herd. When the former are taken from a sparse pasture to a more generous one, especially if the latter be composed of such rich herbage as clovers, or of acrid plants, the above disorder frequently breaks out. Frosted roots or root tops, or too many mangels early in the season, are also common causes of the complaint. When our luxuriant pastures are stocked with the hungry flocks, they should only be allowed an hour or two's run on

the rich herbage daily, until they become accustomed to their new diet. Grass in but a half-dried state, from being wetted by dew or rain, is most unwholesome for animals subject to hoven or blown. Even sound fodder may cause this disorder if the animals have long fasted and then eat an unusually large quantity. When once an animal has become subject to hoven, a slight thing will cause a relapse. The stomach has been strained, as it were, and is no longer equal to the task imposed upon it. Owing to the stretched coats of the rumen it is unable to contract properly on its contents. If animals have been kept on dry food, and, being thirsty, drink eagerly of cold spring water, hoven or blown will probably result. We advise the stock-owner to be at all times cautious in dealing out food to hungry animals, as it is likely to be taken by them with too great avidity; we also counsel that the water be supplied with equal care.

Symptoms.—Owing to the extremely flatulent distention of the rumen, paunch, or first stomach of the sheep, hoven is always accompanied with excessive pain, and the farmer must at once take active steps to alleviate this suffering. The stomach is distended with gas, which is indicated by the enlargement of the whole body, and particularly of the left side, which rebounds against the pressure of the hand, and sounds hollow when tapped upon. The distended paunch presses upon the diaphragm, the breathing becomes laborious, the blood circulates with difficulty through the vessels of the paunch, and it is determined to the head. The animal now becomes gentle, shows an unwillingness to move, and a kind of stupor or semi-unconsciousness rapidly supervenes. During the

whole course of the attack both water and food are rejected.

Treatment.—If the animal be in fit condition for the butcher, it is better to dispose of it at once; but in cases where the sufferers are ewes with lambs, or lean sheep (unfortunately it is such that are most freqently attacked), treatment must not be delayed. Linseed oil is the best medicine to be used by the shepherd. It is a useful application in slight attacks, and may at all times be used without fear of doing injury. When animals suffer from a chronic state of hoven, this oil may be administered in half-pint doses at will. Many other purging medicines that are given leave the bowels afterwards in a most costive state, but this is not the case with either linseed or castor oil. In the present instance we prefer linseed, as being cheaper and equally effectual as castor oil. Should the first dose not give relief in a couple of hours, something more potent must be administered, and it is then advisable to try half an ounce of aromatic spirits of ammonia in a pint of warm water. This should be well shaken before being administered. When other medicines are not at hand, one-third of a pint of whisky or brandy slightly diluted with warm water may be given.

Trocar and Cannula.

In still more urgent cases the trocar and cannula must be resorted to. This consists of puncturing the patient with the trocar, and upon its being withdrawn the cannula may be tied in the wound and left for hours

or days, as long as any signs of the complaint are visible. The instrument may be plunged into the left side, without fear, at the point equidistant from the hip-bone, the last rib, and the lateral processes of the backbone. Only the veterinary surgeon, or any one who has been carefully instructed in this operation, must attempt to carry it out.

Youatt, in upholding the use of the trocar and cannula, observes: "The shepherd should always be supplied with a small trocar; if with two spare cannulas, so much the better. These may be plunged into the flank as readily as the knife, and the cannula may be retained in its situation by means of a string passed round the animal, or at least may be held there by the operator until the gas has all escaped. No portion either of gas or food can then find its way into the belly, and the sheep thus relieved, if the operation has not been too long postponed, will rarely be subject to after indigestion or disease. The rumen suffers very little from the wounds thus inflicted. The author once had occasion to puncture a sheep seven times in the space of four days. Upon its being sent to the butcher two months afterwards there was not a vestige of disease found in the whole of the abdomen, and it was with considerable difficulty that any trace of wound in the rumen could be discovered." Driving the distressed animals, throwing pailfuls of cold water over them, and thrusting agents into their stomachs, down their throats, and other cruel methods of treatment, were practised by our forefathers, but these measures are now mostly discarded, and have given place to the more approved methods of the present day.

Rickets.

This is a disease to which the foal, the calf, the lamb, and a few other young animals, are subject. The lamb is, however, the most common victim, and a large percentage fall victims each year, varying according to the seasons, localities, and different treatment of the mothers and young.

Symptoms.—When about three weeks old the lamb displays an uncertain gait in walking, with a slight lameness behind, and when down finds difficulty in rising. In a week or two the hind-part will appear useless, the back legs being totally ungovernable. The fore-part moves in a normal manner, for the disease does not extend to that portion of the animal. The difficulty in rising becomes greater daily, although no pain appears present. At a certain stage of the disease, if the shepherd hurries the flock, or in any way startles it, the lambs suffering from rickets fall to the ground, as the hind-quarters no longer help to support the body. The fact of the fore-quarters holding their normal strength, and the hinder ones being so helpless, is one of the strongest symptoms of rickets. Shortly the sufferer becomes unable to follow its mother, and partake of her milk, and if not killed it feeds only on any blades of grass that may be near, languishes, and dies. If killed at an early stage of the disease the condition is not lost.

The Cause.—Imperfect nutrition and softening of the bone through a deficiency of earthy salts. Consequently the hinder limbs bend under the weight of the animal, and become distorted. The disease is also hereditary,

while it may arise from bad or insufficient milk. This malady sometimes makes its appearance after confinement to yards, or after other illnesses to which young lambs are liable.

Prevention.—Avoid using a ram that has produced lambs which have suffered from rickets, and also cull any ewes that yean unhealthy lambs. See that the ram and also the ewes at mating time are in vigorous health, while too many females should not be allowed with one ram. Winter the flock on sound land. At yeaning time proper shelter should be given, and the mother with twins should be allowed extra support. When rickets once breaks out the whole flock should have a change of keep at once, and if possible be put into a more luxuriant pasture. If this is not practicable, some cake or sound corn will answer the purpose. In many ailments to which sheep are liable I have found this change of diet an excellent thing, giving keener appetite, purifying the blood, and imparting new vigour to the whole constitution.

Foot-Rot.

Certain breeds of sheep are more subject to foot-rot than others. Among those which chiefly suffer from this disease may be named the "Black-faced" or "Downs;" indeed, so many of them have fallen victims to the complaint that we have been compelled to graze sheep less prone to it.

There are two kinds of the complaint—simple foot-rot, and contagious foot-rot. The first-named is caused

by inflammation of the horn-secreting structures and the adjacent skin, the result of direct irritation. The most common causes of this irritation are—wearing away of the sole to the quick in long journeys on hard roads, abnormal growth of the horn, wet pastures, wounds made with sharp bodies, the accumulation of dry clay or foreign matter between the claws, yarding on hot manure, and iced water round the coronet.

Contagious foot-rot frequently shows itself at the top of the hoof, and is supposed to be caused by a fungoid parasite. This form of the disease may be easily distinguished from the other by the rapidity with which it spreads, not only from one foot to the other, but also to other animals.

Symptoms.—These are much the same in both kinds of the ailment. By observing the flock while grazing the sufferers will, if suffering in the fore feet, be seen upon their knees, which will be found to be quite without wool if the animals are driven to a pen and examined. Should any foreign matter, such as old nails, stones, bits of glass, &c., be lodged in the foot, considerable heat will be felt. By paring down, the offending substance can be removed, and the pain at once relieved. In all attacks, more or less lameness is present.

Treatment.—Place the sheep in a dry shed, give their feet a thorough washing with M'Dougall's carbolic soap, pare away any misshaped horn, and lay bare the diseased surface. Leave the patients until the feet are quite dry, then apply some active caustics and parasiticides. The animal should be kept from the wet pasture until the dressing has had time to well penetrate the foot. For common cases, a mixture of one

part sulphuric acid and three of water, applied with a feather to the diseased portions of the foot, will effect a cure in one or two dressings. A dressing of tar to the sore part is also a good remedy, and may be applied with advantage as a change of dressing after the sulphuric acid. When the attack is severe, the horn must be well pared away, and the foot well poulticed for twenty-four hours, a weak solution of sugar of lead being poured over the poultice to make it more effective. After the latter is removed, dress well with tar, when in a few days the foot should be healed.

Prevention.—Well drain wet land; use only such sheep as the pasture is suited to; immediately any animal is attacked, remove it from the flock and dress the feet at once; and frequently remove any hard clay, &c., from between the claws. Keep the hoofs pared into a normal shape, thus preventing profuse growth at the toe; also see that all sheds frequented by the sheep are thickly besprinkled with lime. The shepherd must always use much despatch to prevent the disorder from reaching a bad stage, or attacking other members of the flock. Overstocking pastures is a practice which leads to this and many other malignant diseases.

Gid or Sturdy.

It is only within the last few years that the above disease has become understood. A knowledge of the different life-stages of the parasitic pest which causes the mischief is interesting to every flock-owner.

Cause.—Gid is the result of the presence of a creature called a cyst or water-bladder in the brain of the sheep, and this gives rise to a nervous ailment, varying much in character, according to the exact position of the cyst. The parasite is picked up by the sheep in egg form, having been distributed on the grass from the tape-worm of the dog (*Tænia cœnurus*). In its cystic form the parasite is technically called *Cœnurus cerebralis.*

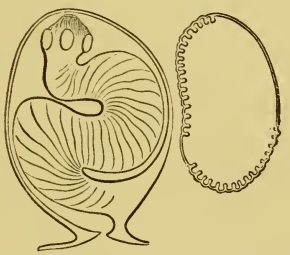
Symptoms.—Every farmer and shepherd knows the ordinary symptoms of gid—simply the frequent turning round of the animal attacked. This circular movement usually takes place in one direction, and is caused by the cyst pressing upon one side of the brain. If the parasite lies to the left, the inclination will be to the left; if on the right, there will be a movement to that side.

Sometimes, however, the bladder or cyst is fixed in the centre of the forehead, then the sufferer moves persistently forward, quickly coming to grief against wall or fence, or in some pond. Again, the cyst may be located in the back of the brain; then the sheep lifts its limbs in a peculiar jerking manner, and sets them down in an uncertain way, which shows the animal has no proper control over them. The sufferer also falls about in a helpless state, and is frequently unable to rise; and it is also unable, even in slight attacks, to graze with its companions, although it will feed and even gain flesh in an early stage of the disease. There is no abnormal movement of the animal when the cyst is dormant, the movements above described not commencing until the parasite becomes active. We have watched a sufferer from "gid" for a considerable time, and noticed no unnatural symptoms, but any

sudden start disturbing the animal would set the cyst in motion and cause the movements. In a few recorded instances the pests are found on both sides of the brain; then the sheep turns to either right or left according to the relative activity of the two parasites. On the opposite side of the body to that on which the brain is attacked the limbs act in a disorderly manner, being partly paralysed.

Treatment.—The sufferer will probably end its days either in pond, river, or some other place from which it cannot extricate itself; the wise farmer will therefore do well, providing the animal is in good condition, to have it slaughtered at once. No part of the carcase is in any way damaged by the disease. In some instances, when the patient is so low in flesh as to be worth considerably more alive than dead, the following treatment will be found effectual:—Apply bags of ice constantly to the brain, when the hydatid or cyst will perish. This treatment was effectually carried out by Mr. Hartenstein in April 1886. Other and more painful means were used previously, one being to force a long knitting-needle up the nostril to pierce the hydatid in the brain. The Scotch shepherds introduced this plan, but it is by no means an advisable one. A more scientific method has been practised by a cousin of the writer and other veterinary surgeons, viz., removing a part of the skull immediately above the bladder, which spot can often be detected by the presence of a soft place. The object is to break the bladder and let the water escape. The fluid will be more easily removed by placing the patient on its back while the cyst discharges its contents, the animal being held so that it is unable to struggle. As the cyst is reduced, a mem-

brane will be found projecting which should be slowly drawn out. This is the parasitic cyst; and projecting from its inner surface will be found several hundreds of little elevations like pin-heads, each representing the head of a tape-worm, and capable of being converted into such if swallowed by a dog. The wound should be covered with a pitch plaster and a leather hood, and the patient ought to be placed in a dark, quiet, secluded box, and fed with soft laxative food for a week.



Cœnurus Cerebralis. Showing the sac with its many heads (reduced). Also a single head magnified.

Prevention.—We have said that each parasitic cyst in the head of a giddy sheep contains several hundreds of minute bodies like pin-heads, and each of these, if eaten by a dog, is capable of producing the matured worm. Therefore dogs should never be allowed to eat *raw* sheep's head; when boiled, the parasite is destroyed. It is well to keep dogs free from these tape-worms, which is done by giving areca-nut, ½ to 1 drachm, according to the size of the dog, on an empty stomach. Sheep should not be allowed to graze where worms are expelled. The tape-worms are seldom passed whole, but are evacuated with the fæces in separate segments

or joints, each of which is charged with innumerable eggs. These, as before observed, are swallowed by sheep, and produce gid or sturdy.

Blind: Enzootic Ophthalmia.

This is a most mysterious although comparatively common disease among flocks which lie in exposed situations. The whole veterinary profession appear to have overlooked the malady, or have not discovered means of treatment, for no book, either ancient or modern, has to our knowledge mentioned it. The omission cannot be on account of the harmless character of the complaint, for it often reduces the sheep in condition, and death frequently results, animals thus afflicted being liable to run into ponds, rivers, and other such dangerous places, from which in their helplessness they are unable to extricate themselves.

Cause.—The cause of the malady is somewhat enveloped in mystery, but our own experience leads us to infer that it partly arises from exposure, which causes inflammation of the conjunctiva and coats of the cornea. A striking instance of this occurred during last year among our own flocks, newly purchased from the Scottish mountains. The sheep, being sent a long journey by train, were much exposed, and soon after reaching their destination they began to drop of blindness, a few each day. This malady is observed more at the latter end of the year, after a wet season; and as it is an inflammatory disorder, doubtless the grass diet has also something to do with it.

Symptoms.—First there will be observed great weeping

of one or both eyes; the sight will not be much impaired, but the influence of glaring light upon the eye gives rise to much irritation. In about forty-eight hours the inflammation will have decreased, and the eyes will become covered with a greyish film or skin, completely destroying the power of vision. It is at this stage that the danger arises of the patients losing their fellows and running into danger. While undisturbed they feed with their fellows, but when once separated they have great difficulty in finding the flock. Total blindness continues for several days, when gradually the film clears away, and the eye is restored to its normal state.

Treatment.—Take the affected sheep as they fall to a dark shed, or some other place into which the powerful rays of the sun cannot penetrate. Feed liberally on any dainty food they will take, excepting beans and heating diet. Give plenty of water and a knob of rock salt. If there be a paddock or field lying convenient (free from ponds and ditches), it would be better for the patients to run out after sunset until the following morning. As a local application, mix the following lotion:—Sulphate of zinc, 2 drachms; acetate of lead, 1 drachm; pure rain-water, 12 ounces. Force open the eyelids of each affected sheep, and with a small glass syringe inject a few drops of the lotion, which must be kept well shaken during use. In malignant cases the film will not be removed by the lotion, and in such instances a little common salt which has been previously heated until quite dry should be placed in a quill and blown into the eye. As soon as the sheep begin to regain their sight they should be returned to the pasture; not, however, among healthy animals, for

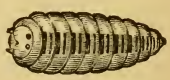
the disease is decidedly infectious, although brought about in the first instance by exposure. When the suffering animals are placed in the darkened shed they should have plenty of air, for if packed too closely they would be liable to take cold again when sent to the pastures. Seeing that the animals are more prone to this disease just upon the approach of winter, their reduced systems should receive every support to enable them to battle with that inclement season.

The Sheep Bot

(*Œstrus Ovis*).

During the sultry months of July and August the sheep botfly is a great annoyance, and the eccentric manner in which the sheep behave is a clear proof to the observer that the *Œstrus Ovis* is on its mischievous errand. This pest being unknown to the majority of stock-owners, the peculiar movements of the flock are frequently assigned to a wrong cause.

Œstrus Ovis (Clark).



Larva of ditto.

Description.—The *Œstrus Ovis* belongs to the large tribe of dipterous or two-winged insects, and is a little larger than the common house-fly. The general colour is an ashy grey, varied as follows:—Forehead a dusty red, with a blackish depression; the antennæ black; the thorax displays numerous small, black, hairy warts The abdomen is of a variegated silky-white, the legs of

a reddish shade, the wings unspotted, and the wing-scales white and large. Like all others of its tribe it is most busy during the heat of the day, more particularly in thundery weather. As the summer season advances the insect becomes stupid and inactive, and may easily be caught and examined.

The Attack.—This species of the fly is not a blood-sucker; its object in attacking the sheep is to deposit its eggs, and the nostrils of the sheep are chosen for this purpose. The eggs soon hatch, and the maggots crawl up the nostril by means of the mouth-hooks with which they are furnished. They then fix themselves securely to the membranes of the cavities in that locality, usually feeding upon the pus caused by their irritating presence, but sometimes they feed upon the membrane itself, and in occasional instances penetrate to the brain. In some cases scarcely perceptible injury is done to the animal host, but in others flesh is lost, and in consequence strength diminishes, and convulsions and death are liable to ensue.

When the fly is pursuing the flock, they, as before observed, show peculiar movements. The animals frequently hold their heads between their fore-legs near the ground, so that the fly cannot approach the nostrils. Another sheep will be found lying in a deep rut or hollow with its nose partially protected. When the animals can resort to a dusty road the dust seems to afford protection against the pest. Sometimes the sheep rush together in one dense assembly and push their noses against each other, so that only those on the outside suffer. Undoubtedly great pain is experienced when the egg is deposited, or the flock would not be so terrified at the presence of the fly.

Different States.—First, the fly deposits its eggs in the nostrils of the sheep in July, the eggs are quickly hatched in such a temperature as then prevails, then the maggots crawl up to the higher cavities, and remain there until they arrive at full growth. In the spring of the year they drop to the ground and enter into the pupa state. In the heat of summer the pupa case opens and releases a fly: this in its turn lays eggs in the sheep's nostrils, and then, as the nights get cool towards autumn, perishes.

Treatment.—Place the sheep in a warm building to tempt the grub from the sinuses, and introduce snuff, solutions of salt, vinegar, tobacco, or weak solutions of turpentine, &c., into the nose to kill them, or cause their expulsion by sneezing. For such as remain in the sinuses, the only successful treatment is to trephine the bones of the face between the front of the eye and the medium line of the face, or just in front of the root of the horn, should that be present. The sinus is then to be syringed out freely with tepid water until the parasites are washed out.

Prevention.—Feed salt from two-inch augur holes bored in a log, the surface of which is smeared with tar, so that the sheep get a dressing every time they partake. Another good plan is to dress the sheep's faces every few days in July with M'Dougall's "Carbolic Smear." Further, plough the ground and bury the creatures when in the pupa state, for where the attacked sheep are grazed there the maggot falls to the earth and assumes at once its pupa state.

Nephritis in Lambs.

It is only within the last year that this disease has been properly understood. It was discovered through the agency of Dr. Unwin of Dunchurch, and the clever investigations of Mr. W. Roger Williams, F.R.C.S., surgical registrar to the Middlesex Hospital. It so happened that in 1884 a farmer (Mr. Goodacre) residing in the vicinity of Dunchurch, losing a lot of lambs from a certain disease, and the local veterinary surgeons being unable to treat or define the same, Dr. Unwin's attention was called to the sufferers, and he, with the assistance, as before observed, of Mr. W. Roger Williams, with praiseworthy perseverance discovered the real nature of the disease.

Symptoms.—We have ourselves had numerous cases of acute nephritis, and can vouch for the accuracy of the information given both by Mr. Goodacre and Mr. Unwin. As soon as born the lamb loses vitality; some, in fact, appear born in an advanced state of the disease, and these die quickly, not being able to stand to suck. In other cases the disease much resembles rickets, but there is this marked difference—in the latter disease lambs only, as a rule, lose the use of the hind-quarters; but in nephritis difficulty of walking is soon followed by inability to stand. Still the sufferers will live for weeks, taking milk from the bottle with great avidity and in abnormal quantities. A neighbour of ours had some cases, and thinking the joints and muscles needed bringing into use, made a miniature sling, into which he put the lambs several times a day, so that their feet could just touch the ground. But this

was of no service, for after prolonged illness the sufferers died—indeed, none recovered. As the disease is getting advanced, when placed on their legs they fall on their side, and kick violently, displaying tremors and choreic movements.

Post-mortem Examination.—This we can best give in Mr. Taylor's own words, respecting an affected lamb from Mr. Goodacre's flock. He says:—"From the account of the disease that had then reached me, I was quite prepared to find rickets. Therefore, upon opening the first body, I was not surprised to see the bladder moderately distended, with turbid, whitish urine, which deposited much sediment on standing. This I fully collected, and proceeded to examine for phosphates, but was surprised to find instead albumen. Moreover, the urine was acid—on microscopical examination no casts, crystals, pus, or blood could be detected; but on removing the kidneys these presented well-marked signs of disease. The capsules separated very readily, exposing a yellowish surface, mottled by the congested stellate veins. One section of the cortex was swollen, and of a pale yellowish tint, and exceedingly soft; the pyramids were firm, and of a deep red colour. On microscopical examination the disease was seen to be acute tubal nephritis. The uriniferous tubules of the cortex were choked and distended by the swollen and degenerated epithelium. In most of the sections the outlines of the individual cells could not be recognised, though the nuclei could often be made out. The cells were in such an advanced stage of granular degeneration that for the most part they had not taken the logwood stain, although the malpighian vessels and adjacent structures had done so. Indeed, the malpighian vascular tufts ap-

peared to be unduly prominent; contrasting markedly with their epithelial lining, the cells that were in an advanced stage of degeneration and like those of the uriniferous tubules had refused the stain. The whole of the tubules of the cortex of each kidney were thus affected, but the interstitial tissues presented a perfectly normal appearance. The epithelium of the tubules of the pyramids was but little affected." The whole of the other organs and parts of the body were carefully examined and found normal.

Prevention is the only alternative. As to cure, so far there is none. In Mr. Goodacre's cases the lambs were offsprings of ewes that were brought down to his pastures from the hills of Scotland just before mating-time. Some of our most reliable writers strongly condemn this practice, deeming it needful for every breeding animal to become settled, and in a measure acclimatised, before impregnation should be allowed to take place; and where this has not been practised, the evil result has displayed itself in the offspring, although the mothers may have been perfectly healthy. Too many ewes should not be run with one male, otherwise the offspring are more liable to the above disease. This is more often the case in the abrupt crosses with the Scotch sheep than with our home breeds.

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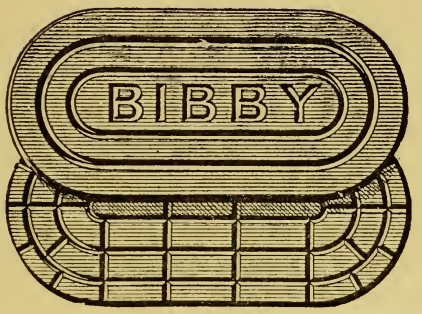

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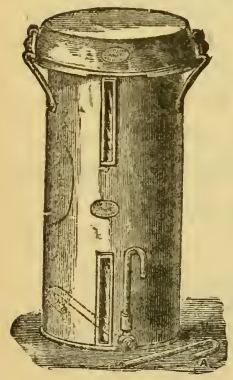

This drawing shows the Creamer Can, which, when filled with milk, is placed under cold water (the patented lid preventing any escape of milk or entry of water into the Can, at the same time allowing impure gases to escape, and become absorbed by the water). The milk while parting with its cream being under water is sealed from the air, and is therefore unaffected by the outside atmosphere, changes of temperature, &c., hence the Creamer can be used equally well in a shed or out-building as in a prepared dairy.

The "Cooley" process ensures sweet cream and milk winter and summer. It yields more cream than any other system, saves labour in manipulation, and is the most rapid and economical process of extracting cream from milk.

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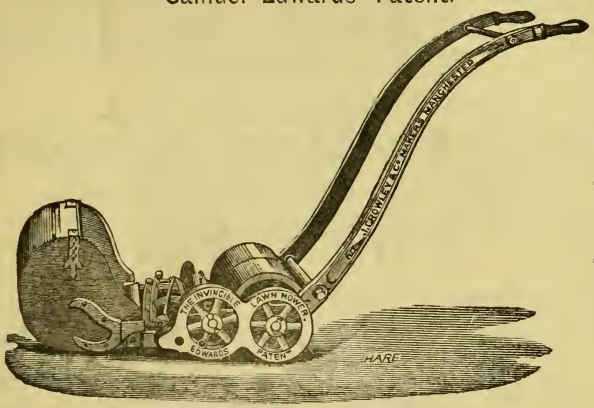

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☞ *These prices include Grass Boxes.*

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DOUBLE CYLINDER,
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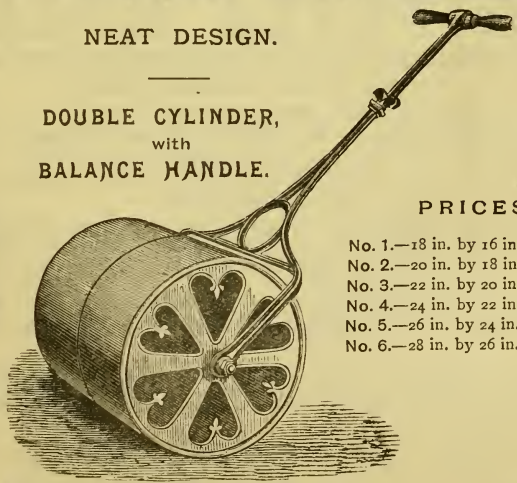
BALANCE HANDLE.



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No. 1.—18 in. by 16 in. ..	42	0
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(See Advertisement on page 139.

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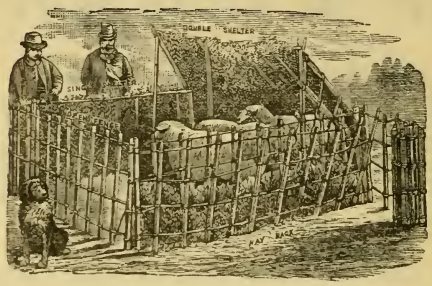

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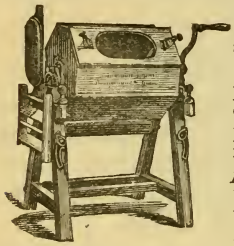

With all barrel or revolving churns (the "Diaphragm" excepted), the cream is worked or churned *from* the centre of motion to its periphery, and what is the necessary consequence or result? The cream that courses *round the periphery* of a barrel churn at each revolution is worked, or churned, say five, ten, or twenty times more than the cream that is nearer or *nearest to the centre* of motion, and the result is that granulation is not simultaneous, the cream becomes tired and sleepy, and *cannot—will not* churn; or, if the butter is at last produced, it is certain to be more or less imperfect in quality—often streaky to the naked eye, and always streaky under the magnifying glass—without true flavour, and only fit for immediate use—that is, "*it won't keep.*"

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THIS convenient and powerful Butter Worker rolls out the butter into a fluted layer by a forward movement, and again rolls or lumps it up by a backward movement, ready for re-rolling, thereby insuring not only its being perfectly cleansed, but also perfectly salted, in the easiest possible manner.

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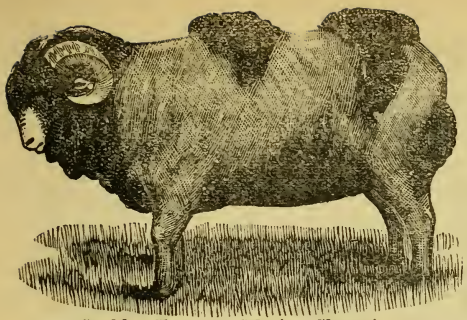

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READILY EXTERMINATED,

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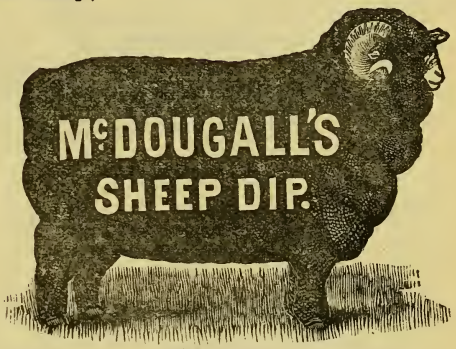

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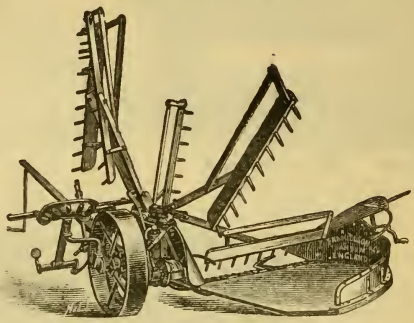

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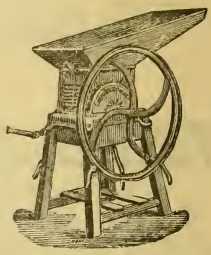

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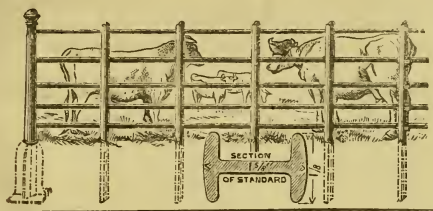

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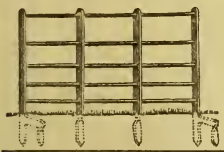

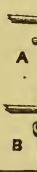

The strongest, cheapest, and most rigid Hurdle ever offered to the public. Drawing A shows the horizontal bar threaded through the upright ready for clenching; and drawing B the horizontal bar after it has been clenched to the upright.

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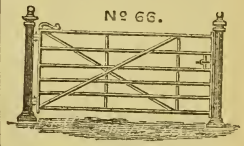
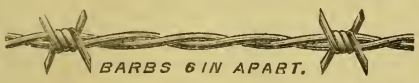
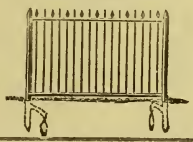


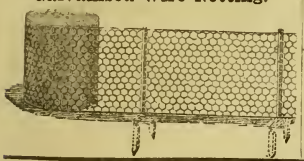
PATENT STEEL BARB WIRE.



Unclimbable Vertical Bar Hurdles.



Galvanised Wire Netting.



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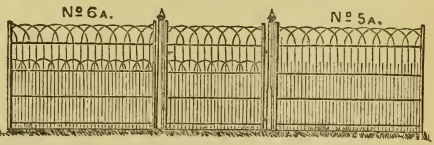
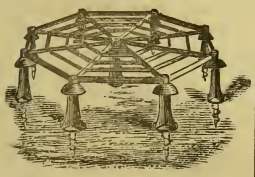
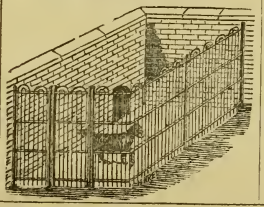


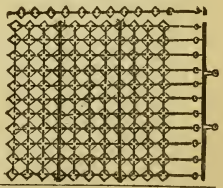
Patent Rick Stand, with Screw Bases.



Dog Kennel Railing.



Patent Chain Harrows, with Steel Expanders.



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